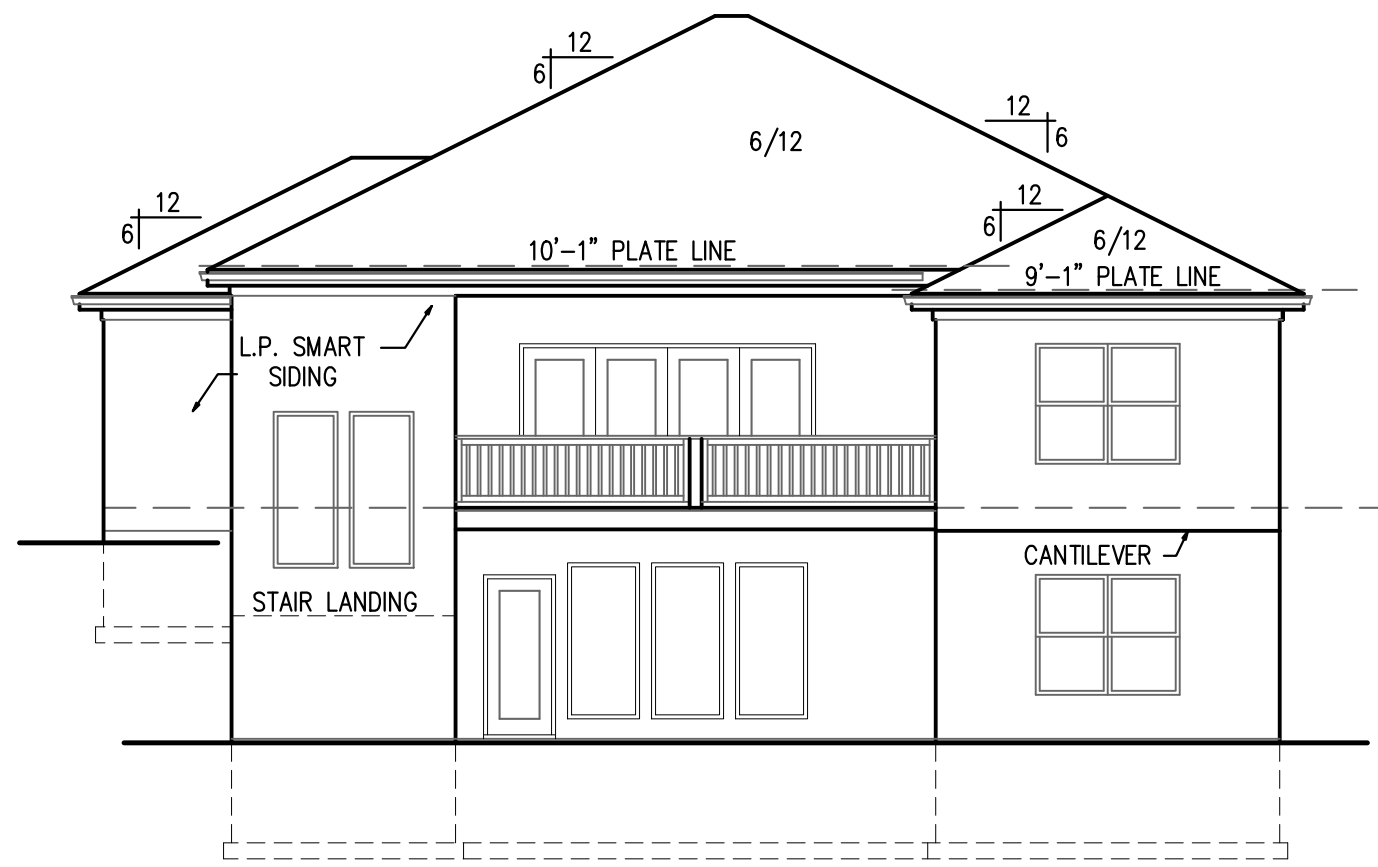
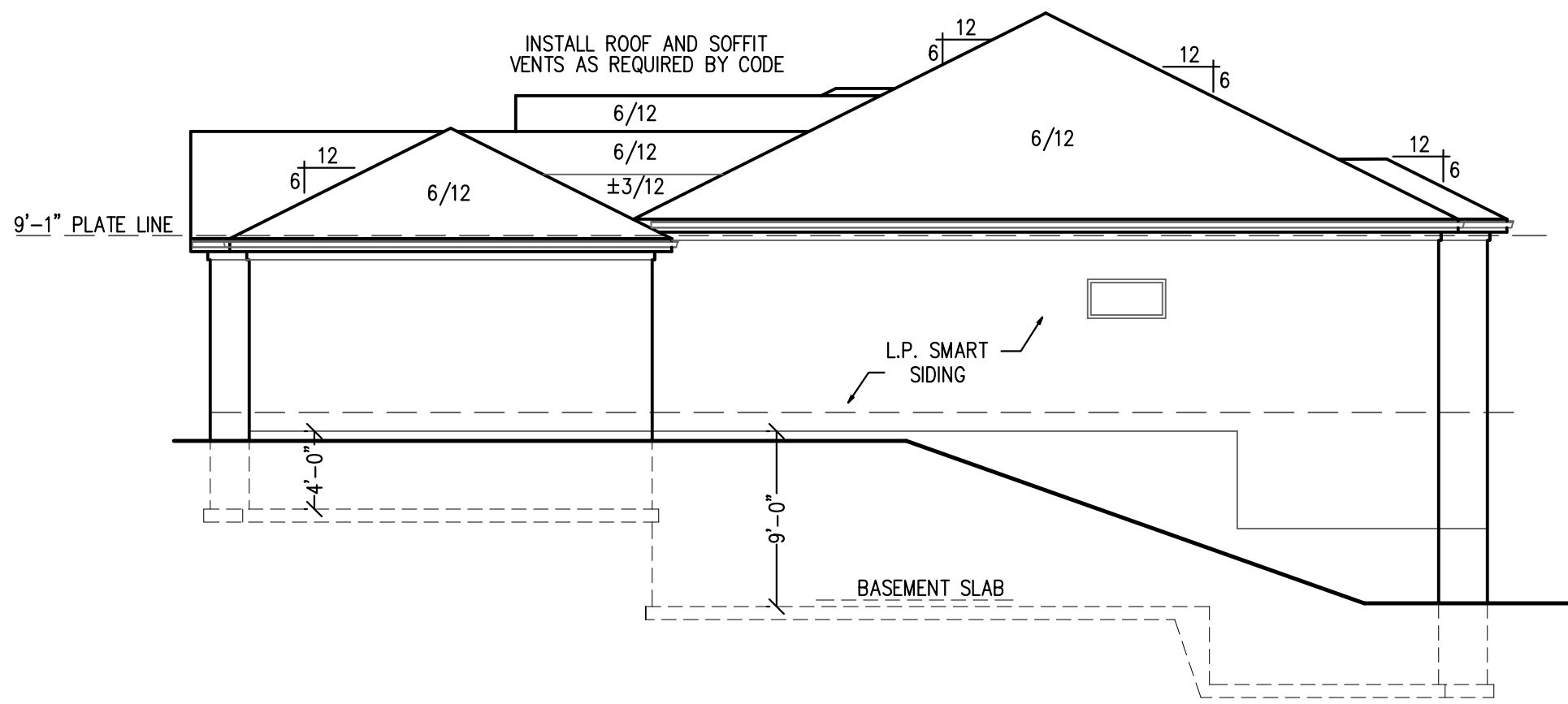


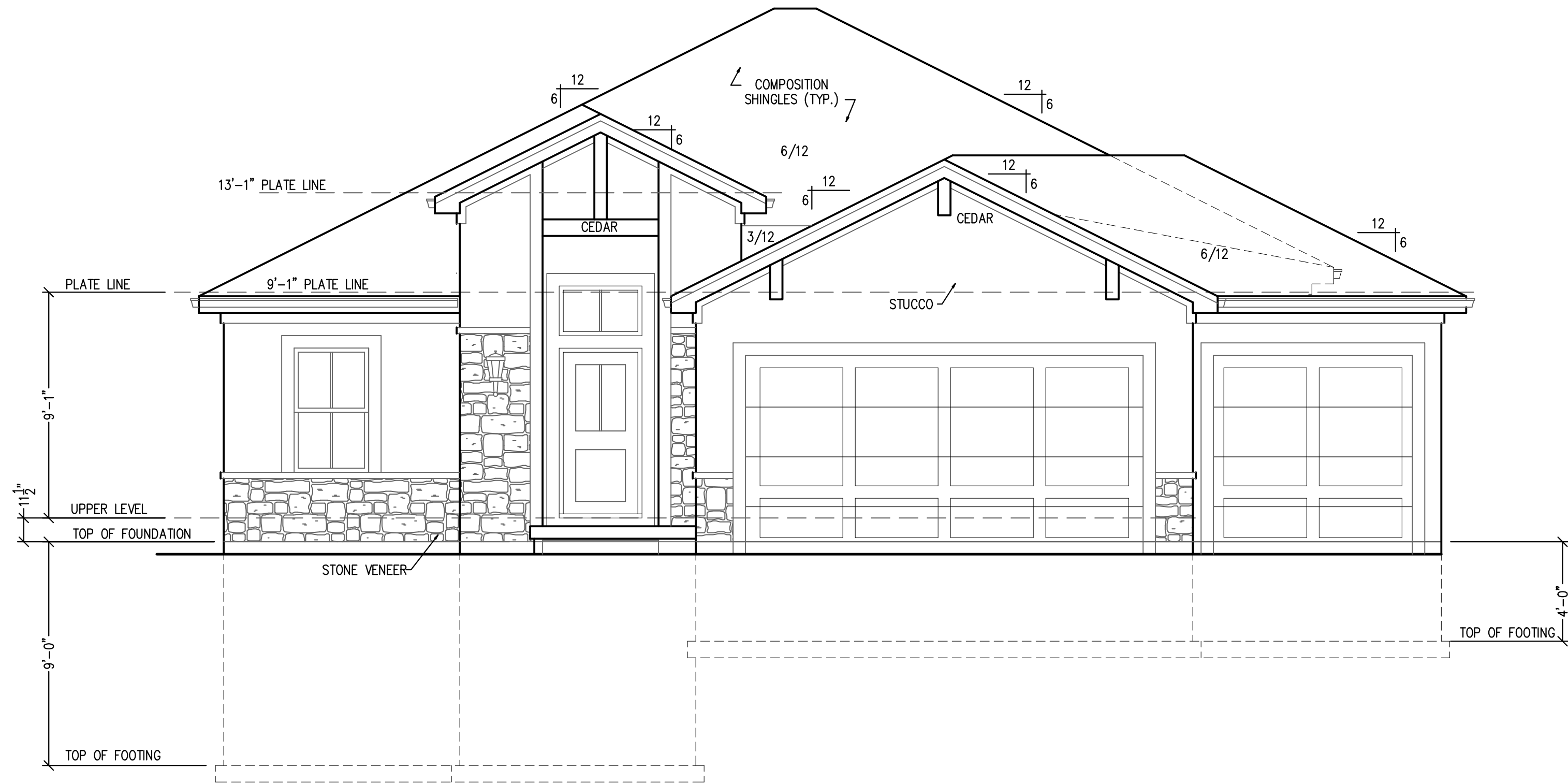
LEFT ELEVATION  
SCALE: 1/8" = 1'-0"



REAR ELEVATION  
SCALE: 1/8" = 1'-0"



RIGHT ELEVATION  
SCALE: 1/8" = 1'-0"



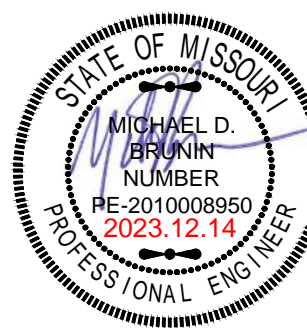
FRONT ELEVATION  
SCALE: 1/4" = 1'-0"

LOWER LEVEL -	707 SQ. FT.
MAIN FLOOR -	1,659 SQ. FT.
TOTAL	2,366 SQ. FT.
Porch	210 SQ. FT.
Garage	652 SQ. FT.
Unfinished	737 SQ. FT.

DISCLAIMER  
ACTUAL PLANS AND ELEVATIONS MAY VARY  
FROM ARCHITECTURAL DRAWINGS.  
DUE TO TERRAIN/BACKFILL PROCESS.  
FRONT ELEVATIONS ARE ARCHITECTURAL  
DRAWINGS AND MAY VARY DUE TO  
MATERIAL AVAILABILITY.  
COMPLIES WITH HERS  
ENERGY RATED

NOTE:  
PLANS DESIGNED PER IRC AS  
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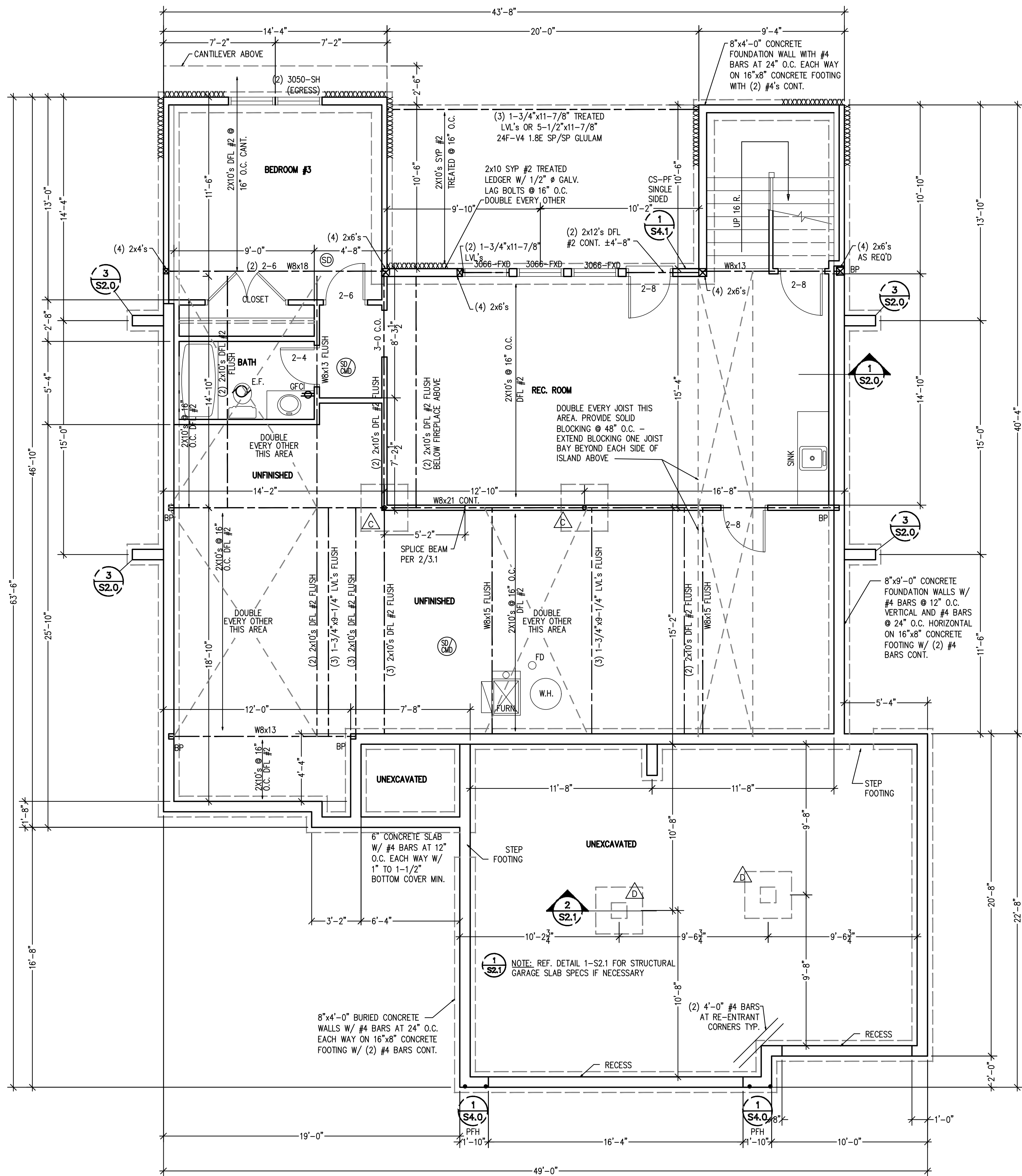
APEX ENGINEERS, INC.  
4525 LOCUST ST.  
KANSAS CITY, MO 64118  
816.421.3222  
STRUCTURAL DESIGN REVIEW  
KANSAS ENGINEERING LICENSE: 992  
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BASEMENT / FOUNDATION PLAN  
SCALE: 1/4" = 1'-0"

NOTE:  
ALL WINDOWS SIZES ARE EXPRESSED  
IN FEET AND INCHES TO THE UNIT SIZE.

STRUCTURAL NOTES:  
- ALL UNMARKED HEADERS MIN (2)#2-2x10  
- ALL HEADERS AND BEAMS MIN #2 GRADE DFL (OR EQ.)  
- [Symbol] = BEARING WALL  
- STRUCTURE NOTED AS FLUSH TO BE FLUSH WITH SUB-FLOOR ABOVE.  
BRACED WALL METHODOLOGY  
CONTINUOUS EXTERIOR SHEATHING PER WSP METHOD (BELOW) UNLESS OTHERWISE NOTED ON THE PLAN

XXXX EXTERIOR BRACED WALLS:  
WSP METHOD: WOOD STRUCTURAL PANEL SHEATHING WITH A THICKNESS NOT LESS THAN 3/4" WITH MINIMUM SPAN RATING OF 24/0 FOR 16" OC STUD SPACING WITH 6d COMMON NAILS AT 6" OC EDGES AND 12" OC FIELD OR SHEATHING THICKNESS NOT LESS THAN 7/8" WITH MINIMUM SPAN RATING OF 24/0 FOR 24" OC SPACING WITH 8d COMMON NAILS AT 6" OC EDGES AND 12" OC IN FIELD.  
(NOTE: FRAMING MEMBERS 16" OC MAX, UNLOCKED, AND WITH SHEATHING APPLIED DIRECTLY TO FRAMING MEMBERS)

//// INTERIOR BRACED WALLS (REF 2-S4.0):  
GB METHOD: 1/2" MIN. GYPSUM BOARD OVER STUDS SPACED 24" MAX. FASTENED WITH No 6 - 1 1/4" TYPE 'W' OR 'S' DRYWALL SCREWS AT 7" OC EDGES AND FIELD (MIN. 4'-0" SECTION FOR BOTH SIDES.)  
OR  
LIB METHOD: 1x4 WOOD FASTENED WITH (3) 8d COMMON NAILS OR SIMPSON / USP 16 GA. TYPE WB (OR EQUAL) STL. X-BRACE(S) AT 45° TO 60° ANGLES. MAXIMUM 16" O.C. STUD FASTENED PER MANUFACTURER'S SPECIFICATIONS.

COLUMN & PIER PAD SCHEDULE (REF. 5/S2.0)			
COLUMN MARK	PAD SIZE	REINFORCEMENT	COLUMN SIZE
1	30" x 30" x 12"	(4) #4 BAR E.W.	3" SCH 40 (3.5" OD)
2	36" x 36" x 12"	(4) #4 BAR E.W.	3" SCH 40 (3.5" OD)
3	42" x 42" x 12"	(5) #4 BAR E.W.	3" SCH 40 (3.5" OD)
4	48" x 48" x 12"	(6) #4 BAR E.W.	3 1/2" SCH 40 (4" OD)
5	54" x 54" x 16"	(8) #4 BAR E.W.	REF PLAN
6	60" x 60" x 16"	(10) #4 BAR E.W.	REF PLAN

1. COLUMN & PAD SIZES SHOWN ARE FOR MAXIMUM ADJUSTABLE COLUMN HEIGHT OF 9'-1". REINFORCEMENT DESIGN IF GREATER THAN 9'-1" TALL COLUMNS SIZED AS QWIK-ADJUST COLUMN BY QUALITY WAY PRODUCTS, LLC. REFER TO SAFE LOADING CAPACITIES PER MANUF. SPECS. OR SUBSTITUTION TO ANOTHER PRODUCT ONLY WITH PRIOR APPROVAL BY APEX ENGINEERS.  
2. COLUMN & PIER PAD SIZES SHOWN ARE BASED ON AN ASSUMED MINIMUM ALLOWABLE SOIL BEARING CAPACITY OF 2,000PSF.

COLUMN & PIER SCHEDULE		
MARK	COLUMN SIZE	PIER DIA.
1	6x6	12"
2	6x6	16"
3	6x6	18"
4	6x6	24"
5	6x6	28"

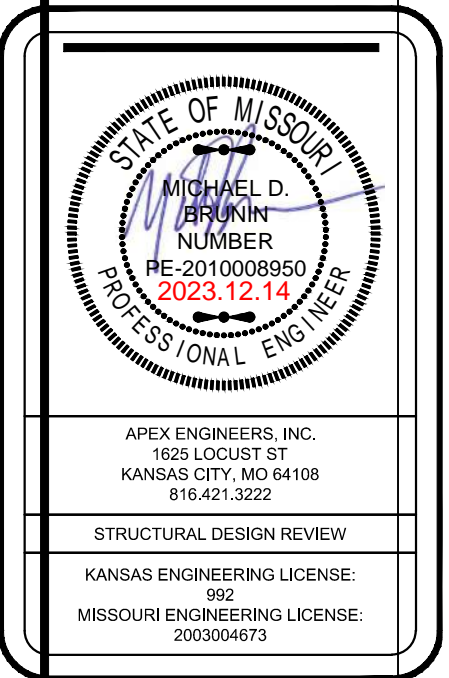
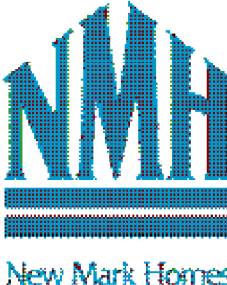
1. ALL PIERS TO BEAR ON ORIGINAL UNDISTURBED SOIL OF 2,000 PSF BEARING CAPACITY OR FILL COMPACTED AND TESTED TO CONFORM TO THE RECOMMENDATIONS OF A GEOTECHNICAL ENGINEER.  
2. PIERS SHALL EXTEND BELOW THE FROST LINE: MIN. DEPTH OF 36" BELOW GRADE.  
3. POST SHALL BE TREATED OR CEDAR WITH SIMPSON ABU66 POST BASE

DETAIL REFERENCES

- 1 TYPICAL FOUNDATION WALL DETAIL  
2 TYPICAL "UNRESTRAINED" FOUNDATION WALL DETAIL  
3 TYPICAL DEAD MAN DETAIL  
4 FOUNDATION WALL JUMP DETAIL  
5 COLUMN PAD DETAIL  
1 TYPICAL STRUCTURAL GARAGE SLAB PLAN  
2 STRUCTURAL GARAGE SLAB PIER PAD DETAIL  
3 STRUCTURAL GARAGE SLAB / WALL SECTION  
6 TYPICAL OVERDIG DETAIL AT BASEMENT SLAB  
1 ALTERNATE BRACED WALL PANEL DETAIL  
1 APA NARROW WALL BRACING METHOD WITHOUT HOLD-DOWNS ALT.  
1 COLUMN AND PIER PAD SCHEDULE (SHEET S2.0)

EXPANSIVE SOILS DISCLAIMER:  
THESE PLANS HAVE BEEN PREPARED BASED ON A PRESUMPTIVE ALLOWABLE BEARING CAPACITY AS ALLOWED BY IRC CODE AND THE LOCAL ENFORCING JURISDICTION.  
APEX ENGINEERS, INC. (APEX) RECOMMENDS THAT ALL FOOTING EXCAVATIONS BE EVALUATED BY A LICENSED GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF ANY FOUNDATION ELEMENTS. GEOTECHNICAL INVESTIGATION AND/OR TESTING IS NOT A SERVICE PROVIDED OR OFFERED BY APEX.  
APEX HAS NOT BEEN RETAINED TO DETERMINE THE EXPANSIVE SOIL CHARACTERISTICS OF THE SUBGRADE SOIL AND THEREFORE CANNOT BE HELD RESPONSIBLE FOR THE VOLUMETRIC CHANGES OF THE SOIL (INCLUDING BELOW THE BASEMENT SLAB), BY USE OF THESE PLANS WITHOUT AN ACCOMPANYING GEOTECHNICAL ENGINEERING REPORT, APEX SHALL NOT BE HELD LIABLE FOR ANY FUTURE MOVEMENT AND/OR DIFFERENTIAL MOVEMENT OF THE PROPOSED STRUCTURE AND THE POSSIBLE DAMAGE THAT MAY BE CAUSED AS A RESULT OF SUCH MOVEMENT. DAMAGE FROM EXPANSIVE SOILS AND/OR SETTLEMENT CAN RESULT IN AMONGST OTHER THINGS, THE FOLLOWING: BASEMENT SLAB HEAVE, SHEETROCK CRACKS, WINDOWS AND DOOR BECOMING OUT OF PLUMB AND STICKING AND/OR NOT OPENING, DAMAGE TO TILE, MOULDING, AND OTHER COSMETIC FINISHES.

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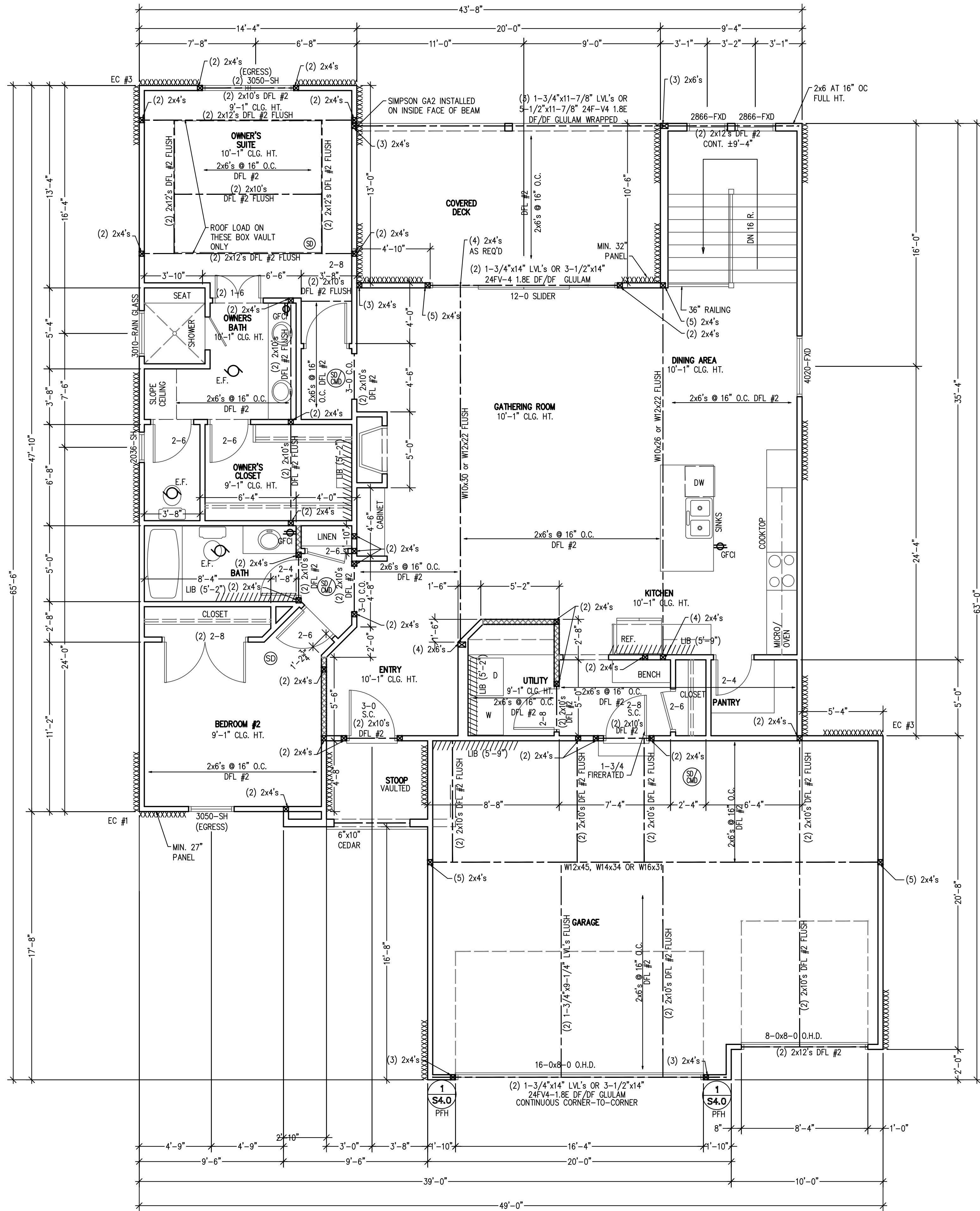
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MAIN FLOOR PLAN  
SCALE: 1/4" = 1'-0"

STRUCTURAL NOTES:  
- ALL UNMARKED HEADERS MIN (2)#2-2x10  
- ALL HEADERS AND BEAMS MIN #2 GRADE DFL (OR EQ.)  
- [XXXXXX] = BEARING WALL  
- STRUCTURE NOTED AS FLUSH TO BE FLUSH WITH SUB-FLOOR ABOVE.

BRACED WALL METHODOLOGY  
CONTINUOUS EXTERIOR SHEATHING PER WSP METHOD (BELOW)  
UNLESS OTHERWISE NOTED ON THE PLAN

XXXX EXTERIOR BRACED WALLS:

WSP METHOD: WOOD STRUCTURAL PANEL SHEATHING WITH A THICKNESS NOT LESS THAN 3/8" WITH MINIMUM SPAN RATING OF 24/0 FOR 16" OC STUD SPACING WITH 6d COMMON NAILS AT 6" OC EDGES AND 12" OC FIELD OR SHEATHING THICKNESS NOT LESS THAN 3/8" WITH MINIMUM SPAN RATING OF 24/0 FOR 24" OC SPACING WITH 8d COMMON NAILS AT 6" OC EDGES AND 12" OC IN FIELD.  
(NOTE: FRAMING MEMBERS 16" OC MAX. UNBLOCKED, AND WITH SHEATHING APPLIED DIRECTLY TO FRAMING MEMBERS)

//// INTERIOR BRACED WALLS (REF 2-S4.0):

GB METHOD: 1/2" MIN. GYPSUM BOARD OVER STUDS SPACED 24" MAX. FASTENED WITH No 6 - 1/2" TYPE 'W' OR 'S' DRYWALL SCREWS AT 7" OC EDGES AND FIELD (MIN. 4'-0" SECTION FOR BOTH SIDES.)

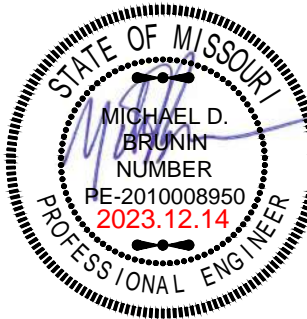
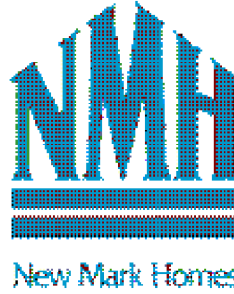
OR

LIB METHOD: 1x4 WOOD FASTENED WITH (3) 8d COMMON NAILS OR SIMPSON / USP 16 GA. TYPE WB (OR EQUAL) STL. X-BRACE(S) AT 45° TO 60° ANGLES, MAXIMUM 16" O.C. STUD FASTENED PER MANUFACTURER'S SPECIFICATIONS.

ALL WINDOWS SIZES ARE EXPRESSED  
IN FEET AND INCHES TO THE UNIT  
SIZE.

NOTE:  
PLANS DESIGNED PER IRC AS  
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816.421.3222

STRUCTURAL DESIGN REVIEW

KANSAS ENGINEERING LICENSE: 992  
MISSOURI ENGINEERING LICENSE: 2003004673

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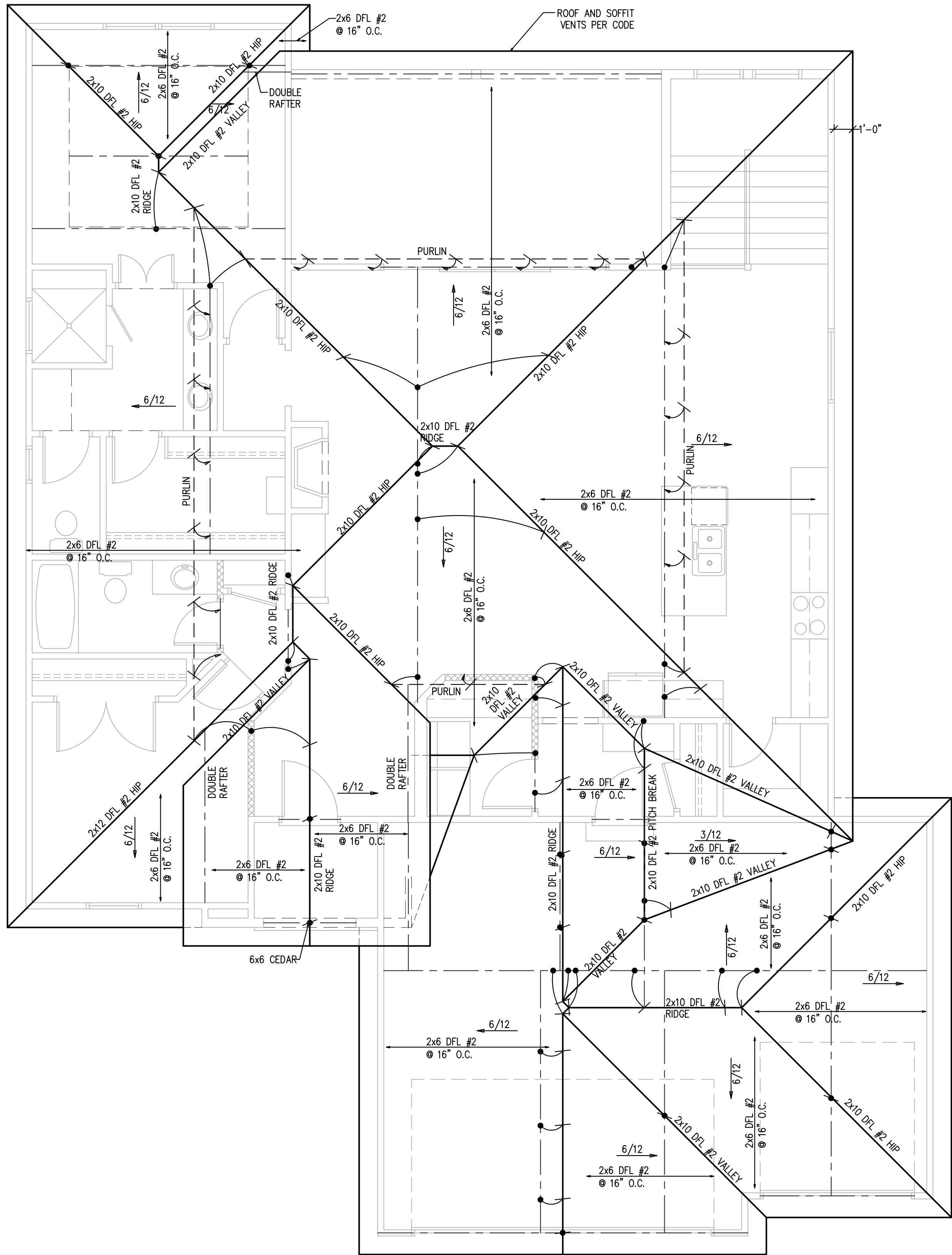
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ROOF PLAN  
SCALE: 1/4" = 1'-0"

STRUCTURAL NOTES:  
- ALL UNMARKED HEADERS MIN (2)#2-2x10  
- ALL HEADERS AND BEAMS MIN #2 GRADE DFL (OR EQ.)  
- XXXXX-BEARING WALL  
- STRUCTURE NOTED AS FLUSH TO BE FLUSH WITH SUB-FLOOR ABOVE.

ROOF FRAMING NOTES

ROOF DESIGNED FOR LIGHT ROOF COVERING  
30psf TOTAL LOAD [10psf DL, 20psf LL (SL)]

ROOF SYSTEM IS DESIGNED TO MEET REQUIREMENTS  
OF IRC 802

\*RAFTERS (HEM-FIR, DOUG-FIR, OR EQUAL):  
SEE SPAN CHARTS BELOW

CODE MINIMUM

RAFTERS	SPACING	MAX HORIZONTAL CLEARSPAN
#2-2x6	AT 24" OC	11'-7"
#2-2x6	AT 16" OC	14'-2"
#2-2x8	AT 24" OC	14'-8"
#2-2x8	AT 16" OC	17'-11"
#2-2x10	AT 24" OC	17'-10"
#2-2x10	AT 16" OC	21'-11"

NOTE: CODE MINIMUM ALLOWS FOR A RAFTER DEFLECTION OF L/180 TOTAL LOAD

HIGHER PERFORMANCE

RAFTERS	SPACING	MAX HORIZONTAL CLEARSPAN
#2-2x6	AT 24" OC	8'-6"
#2-2x6	AT 16" OC	9'-9"
#2-2x8	AT 24" OC	11'-3"
#2-2x8	AT 16" OC	12'-9"
#2-2x10	AT 24" OC	14'-3"
#2-2x10	AT 16" OC	16'-3"

APEX ENGINEERS, INC. RECOMMENDED  
DEFLECTION = L/360 LIVE LOAD, L/240 TOTAL LOAD

\*RIDGE BOARDS ARE (UNLESS OTHERWISE NOTED)

#2-2x10 UP TO 9:12 PITCH

#2-2x12 OVER 9:12 PITCH

\*ALL HIP AND VALLEYS ARE (UNLESS OTHERWISE NOTED)

#2-2x10 UP TO 9:12 PITCH

#2-2x12 OVER 9:12 PITCH

#2-2x10 HIP/VALLEY, MAX CLEAR SPAN: 11'-11"

#2-2x12 HIP VALLEY, MAX HORIZ. CLEAR SPAN: 12'-11"

\*PURLINS ARE 2x6 MIN

- PURLIN STRUTS ARE AT 4'-0" OC

- PURLIN STRUTS SHALL BE INSTALLED AT NOT LESS

THAN A 45 DEGREE ANGLE WITH THE HORIZONTAL

- ALL PURLIN STRUTS SHALL HAVE A MAX UNBRACED

LENGTH OF 8'-0"

- PURLIN STRUTS SHALL BE CONSTRUCTED IN A "T"

CONFIGURATION AND PER THE FOLLOWING CHART:

PURLIN STRUT	MAX PURLIN STRUT LENGTH
(2)2x4	8'-0"
(1)2x4 AND (1)2x6	12'-0"
(1)2x6 AND (1)2x8	20'-0"
(2)2x6 AND (1)2x8	30'-0"
CONSULT ARCH ENGR	>30'-0"

\*EACH END OF STRUT SHALL BE FASTENED WITH MIN (3)#8  
OR (2)#6d NAILS

\*RIDGE BRACERS ARE SAME AS PURLIN BRACES-SPACING,  
SIZE, CONFIGURATION, AND INSTALLATION (SEE PURLIN  
BRACE NOTES ABOVE)

\*HIP AND VALLEY BRACES ARE THE SAME AS PURLINS SIZE,  
CONFIGURATION, AND INSTALLATION (SEE PURLIN BRACE  
NOTES ABOVE)

= ROOF BRACE/STRUT (PER CHART)  
-SLASH IS TOP END OF BRACE  
-CIRCLE IS BOTTOM END OF BRACE

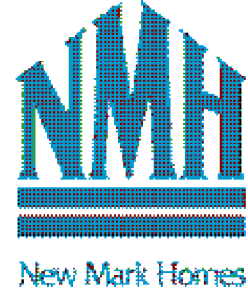
= PURLIN STRUTS AT 48" OC (PER CHART) U.N.O.  
-SLASH IS TOP END OF BRACE  
-ARROW IS BEARING LOCATION

XXXXXXXXXXXX DENOTES BEARING WALL  
----- DENOTES PURLIN  
----- DENOTES BEARING STRUCTURE

1. THIS IS AN ENGINEERED ROOF STRUCTURE DESIGNED FOR COMPLIANCE WITH IRC 802.3, BUILD AS SHOWN WITH NO DEVIATIONS.
2. ALL HIP AND VALLEY BRACES ARE THE SAME AS PURLINS SIZE, CONFIGURATION, AND INSTALLATION (SEE PURLIN BRACE NOTES ABOVE)
3. SHEAR AT BEARING WITH MIN 5 1/2" DEPTH DOES NOT CONTROL DESIGN. FOR VALLEYS REF 4/S3.2

NOTE:  
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ADOPTED BY GOVERNING JURISDICTION

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STRUCTURAL DESIGN REVIEW

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CURTAINS PENETRATING THE THERMAL ENVELOPE SHALL BE ICE-  
 GATED, AND SEALED TO THE GYPSUM WALLBOARD AS  
 PER M1102.4.  
 THERMOSTATS SHALL BE INSTALLED AS REQUIRED PER  
 M1102.4.  
 AIR LEAKAGE RATE FOR MAXIMUM 2% AIR LEAKAGE RATE PER  
 M1103.3.  
 CAVITIES SHALL NOT BE USED AS DUCTS OR  
 PER M1103.3.  
 PIPES SHALL BE INSULATED AS REQUIRED PER M1103.4.  
 FANS SHALL TERMINATE TO THE BUILDING EXTERIOR AS  
 PER M1601.6.  
 SYSTEMS SHALL BE INSTALLED FOR KITCHEN EXHAUST  
 EXCEED 400 CFM AS REQUIRED PER M1503.6.  
 SYSTEMS SHALL NOT SERVE BOTH THE LIVING SPACE AND  
 PER M1601.6.

1. PROVIDE ONE WINDOW FROM EACH BEDROOM THAT HAS A MINIMUM OPENABLE AREA OF 5.7 SQUARE FEET WITH A MINIMUM OPENABLE HEIGHT OF 24 INCHES AND WIDTH OF 20 INCHES.
2. SMOKE ALARMS SHALL MEET THE REQUIREMENTS OF IRC SECTION 310.
3. SMOKE ALARMS SHALL BE INSTALLED AS REQUIRED PER IRC 2018 SECTION R314.
4. PROVIDE SMOKE ALARMS IN EACH SLEEPING ROOM, OUTSIDE OF EACH SLEEPING AREA, ON EACH FLOOR INCLUDING BASEMENTS AND HABITABLE ATTICS, AND NOT LESS THAN 3'-0" HORIZONTALLY FROM DOOR OR OPENING OF A BATHROOM THAT CONTAINS A BATHTUB OR SHOWER. ALARMS SHALL BE INTERCONNECTED SUCH THAT IF SUCH A BATHROOM IS THE LOCATION OF ONE ALARM IT WILL ACTIVATE ALL OF THE ALARMS IN THE DWELLING.
5. CARBON MONOXIDE ALARMS SHALL BE INSTALLED AS REQUIRED PER IRC 2018 SECTION R315.
6. CARBON MONOXIDE ALARMS SHALL BE INSTALLED OUTSIDE OF EACH SLEEPING AREA, WHERE A FUEL-BURNING APPLIANCE IS LOCATED WITHIN A BEDROOM OR ITS ATTACHED BATHROOM. A CARBON MONOXIDE ALARM SHALL BE INSTALLED WITHIN THE BEDROOM.

1. PLANS SHALL COMPLY WITH THE 2018 INTERNATIONAL RESIDENTIAL CODE WITH AMENDMENTS AS ADOPTED BY THE GOVERNING JURISDICTION. IF ANY CHANGES OR DEVIATIONS FROM THE PLANS ARE MADE DURING CONSTRUCTION, CONTRACTOR SHALL NOTIFY THE APPROPRIATE AUTHORITY AND ENGINEER OF RECORD, EITHER BEFORE OR AFTER THE WORK, FOR WHOM MAY REQUIRE REVISED DRAWINGS OR CALCULATIONS AT ITS DISCRETION.

2. REPRODUCTION, ALTERATION, OR RE-USE BY ANY METHOD OF ALL OR PORTIONS OF THESE STRUCTURAL PLANS OR VARIATIONS THEREOF WITHOUT WRITTEN PERMISSION FROM APEX ENGINEERS, INC. IS STRICTLY PROHIBITED. THE DRAWINGS AND DETAILS OF THIS SHEET SET, BEING INSTRUMENTS OF SERVICE, ARE THE PROPERTY OF APEX ENGINEERS, INC. ANY REPRODUCTION, ALTERATION, REVISION, OR A VERSION VOID OF APEX ENGINEER'S LOGO AND/OR TITLE BLOCK, SHALL BE CONSIDERED AN UNAUTHORIZED REPRODUCTION.

3. WHERE DISCREPANCIES EXIST BETWEEN THE STANDARD COMMENTS, NOTES FROM THE DESIGN PROFESSIONAL OR THE CODE, THE MOST RESTRICTIVE SHALL APPLY. THE DWELLING SHALL COMPLY WITH THE FOLLOWING LOAD CONDITIONS:

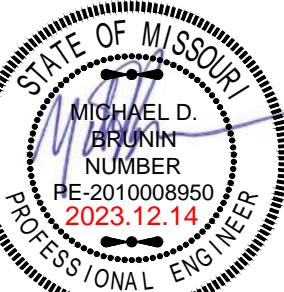
NOTE: HEAVY ROOF COVERING WILL NOT BE INSTALLED OR USED IN THE DESIGN CALCULATIONS UNLESS IT IS SPECIFICALLY NOTED ON THE PLANS THAT THE DESIGN IS FOR HEAVY ROOF COVERINGS.

1. THE FOUNDATION DESIGN SHALL BE BASED ON A MINIMUM SOIL BEARING CAPACITY OF 2000 PSF. UNLESS OTHERWISE INDICATED ON THE PLANS OR IF MODIFIED BY AN ENGINEERING REPORT BASED ON ACTUAL SITE CONDITIONS. PROVIDE A DETAILED SPECIFICATION SHEET, FOR APPLICABLE FOUNDATION CONCRETE MIX DESIGNS.
2. FOOTINGS SHALL EXTEND BELOW THE FROST LINE; MINIMUM DEPTH 36 INCHES BELOW GRADE.
3. UNLESS OTHERWISE NOTED ON THE PLANS OR IF SITE CONDITIONS REQUIRE OTHERWISE, FOOTINGS SHALL BE A MINIMUM OF 16" WIDE AND 8" DEEP WITH (2) #4 BARS CONTINUOUS.
5. COLUMN PADS SHALL BE A MINIMUM 30"x30"x12" WITH (4) #4 BARS EACH WAY UNLESS NOTED OTHERWISE.
6. UNLESS OTHERWISE NOTED OTHERWISE ON THE PLANS, FOUNDATION WALLS SHALL BE MINIMUM 8" THICK X 8'-0" (OR 9'-0") TALL AND REINFORCED PER DETAIL 1-S22.0 (AND 2-S22.0 WHERE APPLICABLE); FOUNDATION WALLS GREATER THAN 10'-0" TALL REQUIRE A SEPARATE ENGINEERED DESIGN. PROVIDE A 2'-0" LONG INTERIOR OR EXTERIOR DEAD-MAN FOR ANY STRAIGHT WALL PANELS.
7. FOUNDATION WALLS SHALL BE MINIMUM 12'-0" IN LENGTH.
7. REINFORCEMENT SHALL BE MINIMUM GRADE 40 UNLESS NOTED OTHERWISE. REINFORCEMENT SHALL LAP A MINIMUM OF 24" AT ENDS, SPLICES, AND AROUND CORNERS.
8. FOUNDATION WALLS SHALL BE BACKFILLED WITH A CLEAN LEAN CLAY (OR EQUIV.) LOW VOLUME CHANGE MATERIAL. ON-SITE MATERIAL MAY BE USED IF DEEMED ACCEPTABLE BY THE GEOTECHNICAL ENGINEER OF RECORD.
9. FOUNDATION WALLS WILL NOT ACHIEVE FULL STRENGTH UNTIL THE BASEMENT SLAB AND THE FIRST FLOOR DECK HAVE BEEN PROPERLY PLACED. IF BACKFILLING THE INTERIOR OF THE FOUNDATION WALL WITH GREATER THAN 12" OF 24" OR 24" OF GRANULAR FILL (A STRUCTURAL BASEMENT SLAB, OR ALTERNATE ENGINEERED SOLUTION (i.e. ENGINEERED FILL) WILL BE REQUIRED.

THESE PLANS HAVE BEEN PREPARED BASED ON A PRESUMPTIVE ALLOWABLE BEARING CAPACITY AS ALLOWED BY IRC CODE AND THE LOCAL ENFORCING JURISDICTION.

**APEX ENGINEERS, INC. (APEX) RECOMMENDS THAT ALL FOOTING EXCAVATIONS BE EVALUATED BY A LICENSED GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF ANY FOUNDATION ELEMENTS. GEOTECHNICAL INVESTIGATION AND/OR TESTING IS NOT A SERVICE PROVIDED OR OFFERED BY APEX.**

APEX HAS NOT BEEN RETAINED TO DETERMINE THE EXPANSIVE SOIL CHARACTERISTICS OF THE SUBGRADE SOIL AND THEREFORE CANNOT BE HELD RESPONSIBLE FOR THE VOLUMETRIC CHANGES OF THE SOIL (INCLUDING BELOW THE BASEMENT SLAB). BY USE OF THESE PLANS WITHOUT AN ACCOMPANYING GEOTECHNICAL ENGINEERING REPORT, APEX SHALL NOT BE HELD LIABLE FOR ANY FUTURE MOVEMENT AND/OR DIFFERENTIAL MOVEMENT OF THE PROPOSED STRUCTURE AND THE POSSIBLE DAMAGE THAT MAY BE CAUSED AS A RESULT OF SUCH MOVEMENT. DAMAGE FROM EXPANSIVE SOILS AND/OR SETTLEMENT CAN RESULT IN AMONGST OTHER THINGS, THE FOLLOWING: BASEMENT SLAB HEAVE, SHEETROCK CRACKS, WINDOWS AND DOOR BECOMING OUT OF PLUMB AND STICKING AND/OR NOT OPENING, DAMAGE TO TILE, MOULDING, AND OTHER COSMETIC FINISHES.



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THE ENERGY EFFICIENCY OF THE DWELLING SHALL COMPLY WITH THE FOLLOWING TABLE(S) (WHERE THERE ARE DISCREPANCIES BETWEEN THIS TABLE AND THE PLANS, THE MOST RESTRICTIVE SHALL APPLY). IF TABLE 1 IS NOT COMPLETED AND ACCOMPANIED BY RESCHECK CALCULATIONS, THEN TABLE 2 SHALL BE APPLIED.

NOTE: FOR USE OF TABLE 1 A ResCheck COMPLIANCE FORM MUST BE SUBMITTED WITH PLANS.

NOTE:  
TABLE 2 PER IRC TABLE N1102.1.2  
\*DEFAULT U-FACTOR FOR DOUBLE PANE, ARGON FILLED LOW-E  
TREATMENT IS U=0.35  
\*\*LIMITED TO AREAS LESS THAN 500 SQ-FT OR 20% OF CEILING AREA.

1. THE ARCHITECT OR ENGINEER OF RECORD SHALL LIST THE DEFERRED SUBMITTALS ON THE PLANS FOR REVIEW BY THE BUILDING OFFICIAL. DOCUMENTS FOR DEFERRED SUBMITTAL ITEMS SHALL BE SUBMITTED TO THE ARCHITECT OR ENGINEER OF RECORD WHO SHALL REVIEW THEM AND RETURN THEM TO THE BUILDING OFFICIAL WITH A LETTER INDICATING THAT THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN REVIEWED AND FOUND TO BE IN THE GENERAL CONFORMANCE TO THE DESIGN OF THE BUILDING. THE DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THE DEFERRED SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY THE BUILDING OFFICIAL. DEFERRED SUBMITTALS ARE DEFINED AS THOSE PORTIONS OF THE DESIGN THAT ARE NOT SUBMITTED AT THE TIME OF THE APPLICATION AND THAT ARE TO BE SUBMITTED TO THE BUILDING OFFICIAL WITH A SPECIFIED PERIOD. DEFERRAL OF ANY SUBMITTAL ITEMS SHALL HAVE THE PRIOR APPROVAL OF THE BUILDING OFFICIAL.

GLAZING IN HAZARDOUS LOCATIONS AS IDENTIFIED IN IRC SECTION R308.4 SHALL BE OF APPROVED SAFETY GLAZING MATERIALS. GLASS IN STORM DOORS; INDIVIDUAL FIXED OR OPENABLE PANELS ADJACENT TO A DOOR WHERE THE NEAREST VERTICAL EDGE IS WITHIN A 24" ARCH OF THE DOOR IN A CLOSED POSITION AND WHOSE BOTTOM EDGE IS WITHIN 60" OF THE FLOOR; WALLS ENCLOSING STAIRWAYS AND LANDINGS WHERE THE GLAZING IS WITHIN 60" OF THE TOP OR BOTTOM OF THE STAIR; ENCLOSURES FOR SPAS, TUBS, SHOWERS, AND WHIRLPOLS; GLAZING IN FIXED OR OPENABLE PANELS EXCEEDING 9 SQUARE FEET AND WHOSE BOTTOM EDGE IS LESS THAN 18" ABOVE THE FLOOR OR WALKING SURFACE WITHIN 36".

MINIMUM STRUCTURAL CONCRETE COVER					COVER
FORMED SURFACES EXPOSED TO GROUND OR WEATHER					2"
UNFORMED SURFACE IN CONTACT WITH THE GROUND					3"
WALLS AND SLABS NOT EXPOSED TO GROUND OR WEATHER					1"
INTERIOR BEAMS AND COLUMNS (TO TIES OF STIRRUPS)					1 1/2"
EPOXY GROUTING APPLICATIONS					
THREADED ROD ANCHORS		HILTI HIT-HY 200 A OR SIMONS SET XP			
REINFORCING BARS		HILTI HIT-HY 200 R OR SIMONS SET XP			
CONCRETE USE	28 DAY STRENGTH	CEMENT TYPE	W/C RATIO	SUMP LUMP (in.)	% AIR ENTRAINMENT
FOOTINGS/SLABS	3000 psi	N/A	0.55 (MAX)	5" (+/-1")	6% +/- 1%
FOUNDATION WALLS	3500 psi	N/A	0.50 (MAX)	4" (+/-1")	6% +/- 1%
INTERIOR SLABS	4000 psi	N/A	0.50 (MAX)	3" (+/-1")	3% MAX
SUSPENDED SLABS	4000 psi	N/A	0.50 (MAX)	3" (+/-1")	3% MAX

1. THE GARAGE FLOOR SHALL SLOPE TOWARDS THE GARAGE DOORWAYS.
2. DOORS BETWEEN THE GARAGE AND THE DWELLING - MINIMUM 1-3/8" SOLID CORE OR HONEY COMBED STEEL DOOR OR 20-MINUTE FIRE RATED.
3. THE GARAGE SHALL BE SEPARATED FROM THE RESIDENCE AND ITS ATTIC AREA BY 5/8" TYPE X GYPSUM BOARD, OR EQUIVALENT MATERIALS APPROVED BY THE BUILDING DEPARTMENT. CONSTRUCTION APPLIED TO GARAGE SIDE IS WHERE THE SEPARATION IS A FLOOR-CEILING ASSEMBLY, THE STRUCTURE SUPPORTING THE SEPARATION SHALL ALSO BE PROTECTED BY 5/8" TYPE X GYPSUM BOARD, OR MATERIALS APPROVED FOR ONE-HOUR FIRE-RESISTIVE CONSTRUCTION OR EQUIVALENT, APPLIED TO THE GARAGE SIDE. PULL DOWN STAIRS LOCATED WITHIN GARAGE SHALL BE RATED TO BE ADEQUATELY PROTECTED WITH MATERIALS APPROVED FOR ONE-HOUR FIRE-RESISTIVE CONSTRUCTION. ATTIC ACCESS PANELS LOCATED WITHIN GARAGE SHALL BE OF 5/8" TYPE X GYPSUM BOARD, OR MATERIALS FOR ONE-HOUR FIRE-RESISTIVE CONSTRUCTION.
4. GARAGE DOOR AND FRAME- THE H-FRAME FOR THE ATTACHMENT OF THE TRACK AND COUNTER BALANCE SHALL CONSIST OF THE FOLLOWING: 2x6 VERTICAL, JAMBS RUNNING FROM THE FLOOR TO CEILING ATTACHED WITH 1-3/4" X 12" NAILS AT 12" OC STAGGERED WITH (7) 3-1/4" X 12" NAILS THRU THE JAMB INTO THE STUD, MINIMUM 2x8 HEADER AT ATTACHMENT OF COUNTER BALANCE SYSTEM.
5. SELF-CLOSING DEVICES SHALL BE INSTALLED FOR GARAGE AND/OR DWELLING SEPARATION DOORS PER R302.5.1.

1. STAIRWAYS SHALL PROVIDE A MAXIMUM 7-3/4" RISE AND MINIMUM 10" RUN.
2. PROVIDE MINIMUM 36" GUARDRAILS ON THE OPEN SIDES OF RAISED FLOORS, PORCHES, AND BALCONIES; MINIMUM 34" GUARDRAILS ON THE OPEN SIDES OF STAIRWAYS LOCATED MORE THAN 30" ABOVE THE FLOOR OR GRADE BELOW. GUARDRAIL ENCLOSURES SHALL HAVE INTERMEDIATE RAILS OR ORNAMENTAL MOTIFS THAT DO NOT ALLOW PASSAGE OF A SPHERE 1" IN DIAMETER.
3. EACH STAIRWAY OF THREE OR MORE RISERS SHALL PROVIDE A CONTINUOUS HANDRAIL ON AT LEAST ONE SIDE BETWEEN 34" AND 38" ABOVE THE NOSING OF THE TREADS.
4. HANDRAILS SHALL HAVE A CIRCULAR CROSS SECTION OF 1-1/4" MINIMUM TO 2" MAXIMUM OR OTHER APPROVED GRASPABLE SHAPE PER IRC SECTION 311.7.6.5.
5. PROVIDE A MINIMUM 6-8" OF HEADROOM CLEARANCE IN STAIRWAYS.
6. PROVIDE ACCESSIBLE SPACE UNDER STAIRWAYS SHALL HAVE WALLS AND THE UNDERSIDE OF THE STAIR AND LANDING PROTECTED WITH 1/2" GYPSUM BOARD ON ENCLOSURE SIDE PER IRC SECTION 302.7.
7. SPIRAL STAIRS TO BE CONSTRUCTED PER IRC SECTION 311.7.10.1.
8. SPACE STRINGERS AT 16" OC MAX.

BUILDING COMPONENT	MATERIAL	FASTENING
ROOF SHEATHING <sup>1</sup>	7/16" PLYWOOD 1x4 #3 FURRING	16 GA x 1-3/4" STAPLES AT 3" OC EDGES AND 6" OC IN FIELD 1/2" CROWN STAPLES
FLOOR SHEATHING <sup>1</sup>	3/4" T&G YELLOW PINE PLYWOOD APPLIED PERPENDICULAR TO JOISTS AND ENDS STAGGERED	8d COMMON NAILS AT 6" OC EDGES AND 12" OC IN THE FIELD 14 GA x 2" STAPLES AT 4" OC EDGES AND 8" OC IN THE FIELD 12.5 GA x 1-1/2" RING OR SCREW SHANK NAILS AT 6" OC EDGES AND 8" OC IN THE FIELD
CEILING COVERING <sup>1</sup>	1/2" GYPSUM SHEATHING	7" OC NAILED / 12" OC SCREWED WITH 13 GA, 1-3/8" LONG, 19/64" HEAD, 0.098 DIA, 1-1/4" LONG, ANGLE-RINGED; 5d COOLER NAIL, 0.086 DIA, 1-5/8" LONG, 15/64" HEAD; OR GYP BD NAIL, 0.086 DIA, 1-5/8" LONG, 9/32" HEAD
INTERIOR WALL COVERING <sup>1</sup>	1/2" GYPSUM SHEATHING	6d COMMON NAILS; 1-5/8" GALVANIZED STAPLES; 1-1/4" SCREWS, TYPE W OR S; AT 4" OC EDGES AND 8" OC IN THE FIELD
EXTERIOR WALL SHEATHING	MIN 3/8" APA RATED SHEATHING	8d COMMON NAILS AT 6" OC EDGES AND 12" OC IN THE FIELD
CONVENTIONAL WOOD FRAMED WALLS	*SUPPORTING 2 FLOORS, ROOF, AND CEILING OR LESS. *HEIGHT: 10'-0" OR LESS SIZE: NOM 2x4 (NOM 2x6 WHEN SUPPORTING 2 FLOORS, CEILING, AND ROOF) *SPECIES: DOUG-FIR, HEM-FIR, SOUTH PINE, SPRUCE-PINE-FIR *MAXIMUM SPACING 16" OC *STUDS 10' LENGTH OR LESS SHALL BE #3 STANDARD, OR STUD GRADE *STUDS OVER 10' LENGTH SHALL BE MIN #2 GRADE	*TOE NAIL RIM JOIST TO SILL OR TOP PLATE. *TOE NAIL STUD TO TOP AND SOLE PLATE. *END NAIL TOP AND SOLE PLATE TO STUD. *FACE NAIL BUILT-UP CORNER STUDS *FACE NAIL BUILT-UP CORNER STUDS (AT BRACED WALL PANELS) *FACE NAIL JACK STUDS/TRAMMERS SUPPORTING HEADERS WITH: FACE NAIL DBL TOP PLATE. DBL TOP PLATES WITH MIN 48" OFFSET OF EACH. FACE NAIL LAPPED AREA WITH FACE NAIL DBL TOP PLATE AT LAPPED CORNERS AND INTERSECTIONS WITH FACE NAIL SOLE PLATE TO FRAMING SYSTEM WITH: *TOENAIL BRIDGINGS TO JOIST, EACH END FACE NAIL LEDGER STRIPS SUPPORTING JOISTS OR RAFTERS WITH: 8d COMMON AT 6" OC; 3"x10" AT 6" OC; 3"x6; 131" AT 6" OC (4) 8d COMMON; (4) 3"x10; 131" (2) 16d COMMON; (3) 3"x6; 131" 16d AT 24" OC; 3"x6; 131" AT 16" 16d COMMON NAILS AT 16" OC; 3"x6; 131" AT 12" OC 10d NAILS AT 6" OC 16d COMMON AT 16" OC; 3"x6; 131" AT 12" OC; 3"x6; 128" AT 12" OC (8) 16d COMMON; (12) 3"x6; 131"; (12) 3"x6; 128" (2) 16d COMMON; (3) 3"x6; 131"; (3) 3"x6; 128" 16d COMMON AT 16" OC; 3"x6; 131" AT 12" OC (2) 8d COMMON; (2) 3"x6; 131"; (3) 3"x6; 128" (3) 16d COMMON; (4) 3"x6; 131"; (4) 3"x6; 128"
CONVENTIONAL WOOD HEADER FRAMING	PER PLAN	*TOE NAIL HEADERS TO WALL STUDS WITH (4) 8d NAILS AT EACH END. *FACE NAIL DOUBLE PIECE HEADERS WITH 16d NAILS AT 16" CENTERS ALONG EACH EDGE.
RAFTER TIES <sup>1</sup>	MIN 2x4 MEMBERS AT EACH RAFTER	REF TABLE R802.5.2
COLLAR TIES	MIN 1x4 MEMBERS AT 48" OC	FACENAIL TO RAFTERS IN UPPER 1/3 OF ATTIC SPACE WITH 16d NAILS AT EACH
1. NOTE: ALL SHEATHING MATERIALS TO BE APPLIED PERPENDICULAR TO JOISTS AND ENDS STAGGERED. 2. RAFTER TIES SHALL NOT BE REQUIRED WHEN A STRUCTURAL RIDGE HAS BEEN PROVIDED AND ADEQUATELY DESIGNED (AS IN A FULLY VAULTED ROOM). SUCH SHALL BE NOTED AS "STRUCTURAL" ON THE PLAN.		
BUILDING COMPONENT	FASTEN TO	FASTEN WITH
RAFTERS	TO RIDGE/VALLEY/HIP RAFTERS	TOENAIL WITH (4) 16d ENDNAIL WITH (3) 16d
	TO PLATE	TOENAIL WITH (2) 16d
CEILING JOISTS	TO TOP PLATE WHERE CEILING JOISTS RUN PARALLEL TO RAFTERS FACENAIL TO RAFTERS WITH (3) 16d MIN.	TOENAIL WITH (3) 8d AT EACH END
FLOOR JOISTS	TO SILL OR GIRDER TO RIM JOIST	TOENAIL WITH: (3) 8d COMMON; (3) 3"x10; 131"; (4) 3"x10; 128" ENDNAIL WITH: (3) 16d COMMON; (4) 3"x10; 131"; (4) 3"x10; 128"
BRACED WALL PANELS PERP TO FRAMING MEMBERS ABOVE/BELOW: PARALLEL TO FRAMING MEMBERS ABOVE/BELOW:	TO FRAMING MEMBER TO FRAMING AND BLOCKING AT 16" OC	SOLE PL, 16" OC WITH: (3) 16d COMMON; (4) 3"x10; 131" TOP PL, 6" OC WITH: 8d COMMON; 3"x10; 131" SOLE PL, 16" OC WITH: (3) 16d COMMON; (4) 3"x10; 131" AND AT EACH BLOCK: (3) 16d COMMON; (4) 3"x10; 131" TOP PL, 6" OC WITH: 8d COMMON; 3"x10; 131" AND AT EACH BLOCK: (3) 8d COMMON; (3) 3"x10; 131"
NOTE: MEMBER THICKNESS AND FASTENING LISTED IN THIS SCHEDULE ARE MINIMUM IRC REQUIREMENTS. SPECIFIC PROJECT REQUIREMENTS NOTED WITHIN THE STRUCTURAL OR ARCHITECTURAL DRAWINGS, IF REQUIRED BY APEX ENGINEERS DESIGN NEEDING TO BE MORE STRINGENT, SHALL BE FOLLOWED.		

**PROJECT:**  
2773 S.W. 11th Street  
Highland Meadows - Lot 184  
Lee's Summit, Missouri

**CLIENT:**  
New Mark Homes

PROJECT #:	23-2017
DRAWN BY:	TDA
CHECKED BY:	BDC
SUBMITTAL DATE:	2023.12.14

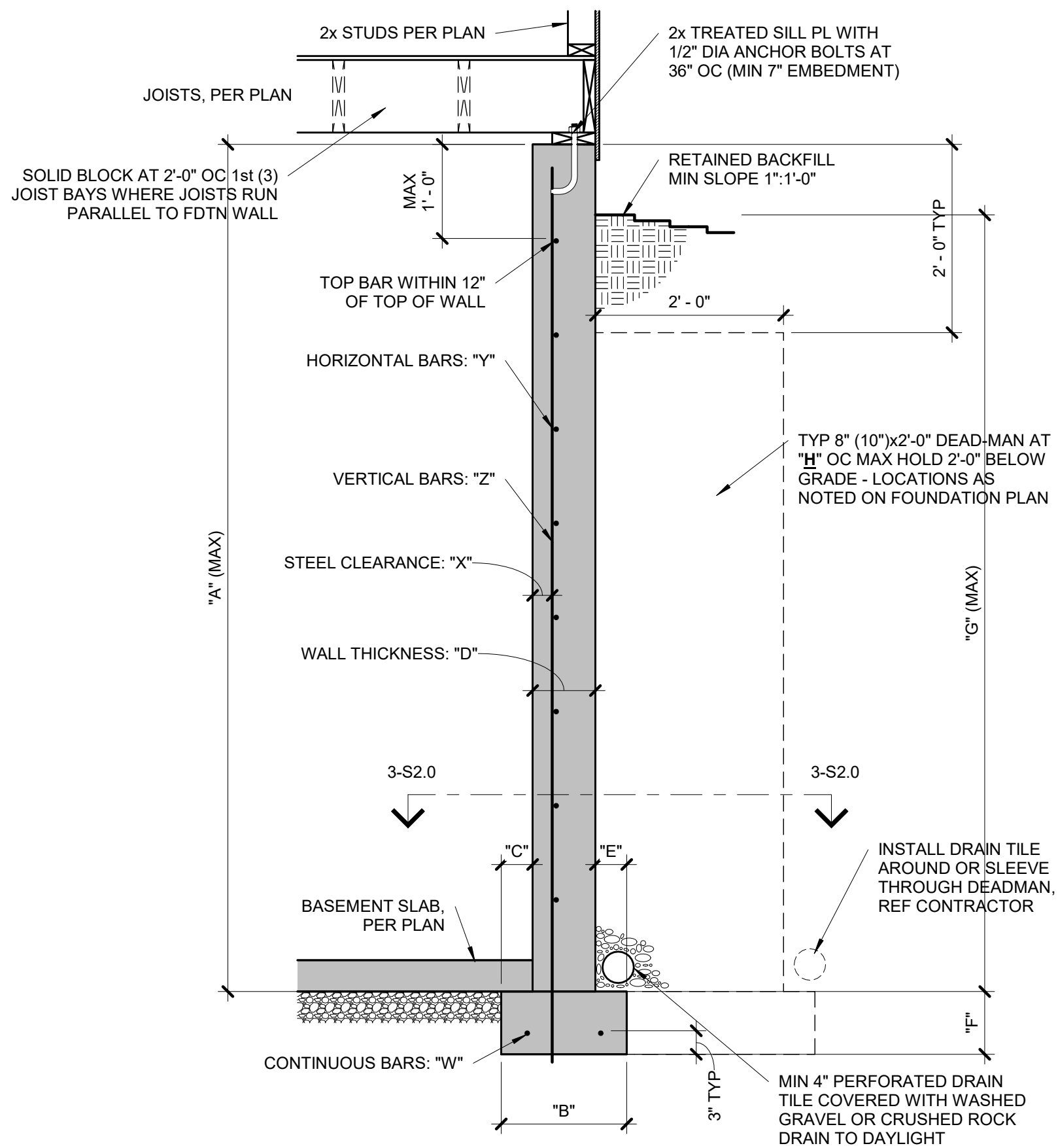
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SHEET:

GENERAL NOTES

S1.0





#### CONCRETE DIMENSIONS

"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"
8'-0"	1'-4"	4"	8"	4"	8"	7'-6"	20'-0"
9'-0"	1'-4"	4"	8"	4"	8"	8'-6"	20'-0"
10'-0"	1'-8"	5"	10"	5"	10"	9'-6"	20'-0"

#### REINFORCING BARS (GRADE 40 BARS)

"W"	"X"	"Y"	"Z"
(2) #4	2 1/2"	#4 BARS AT 24" OC	#4 BARS AT 24" OC
(2) #4	2 1/2"	#4 BARS AT 24" OC	#4 BARS AT 24" OC
(2) #4	2 1/2"	#4 BARS AT 18" OC	#4 BARS AT 18" OC

##### NOTES:

- DIMENSION SHOWN IS FOR MAXIMUM UNINTERRUPTED WALL PANEL LENGTH BEFORE A DEAD-MAN SHALL BE INSTALLED. NOTE: A MINIMUM 2'-0" RETURN OR OFFSET IN THE FOUNDATION WALL SHALL SUBSTITUTE AS A DEAD-MAN AND/OR BREAK IN THE WALL PANEL LENGTH.
- VERTICAL REINFORCING STEEL TO EXTEND TO WITHIN 8" OF TOP WALL. MINIMUM (1) #4 HORIZONTAL BAR WITHIN 12" OF TOP AND BOTTOM OF WALL.
- BURIED CONCRETE FOUNDATION WALLS UP TO 9'-0" TALL MAY BE 8" NOMINAL THICKNESS WITH #4 BARS AT 24" OC BOTH WAYS OVER 16"x8" CONCRETE FOOTINGS WITH (2) #4 BARS CONTINUOUS, UNLESS OTHERWISE REQUIRED BY ENGINEERING REPORT BASED ON ACTUAL SITE CONDITIONS.
- WALL WILL NOT ACHIEVE FULL STRENGTH UNTIL FIRST FLOOR DECK AND BASEMENT SLAB HAVE BEEN PLACED.

#### 1 TYPICAL FOUNDATION WALL

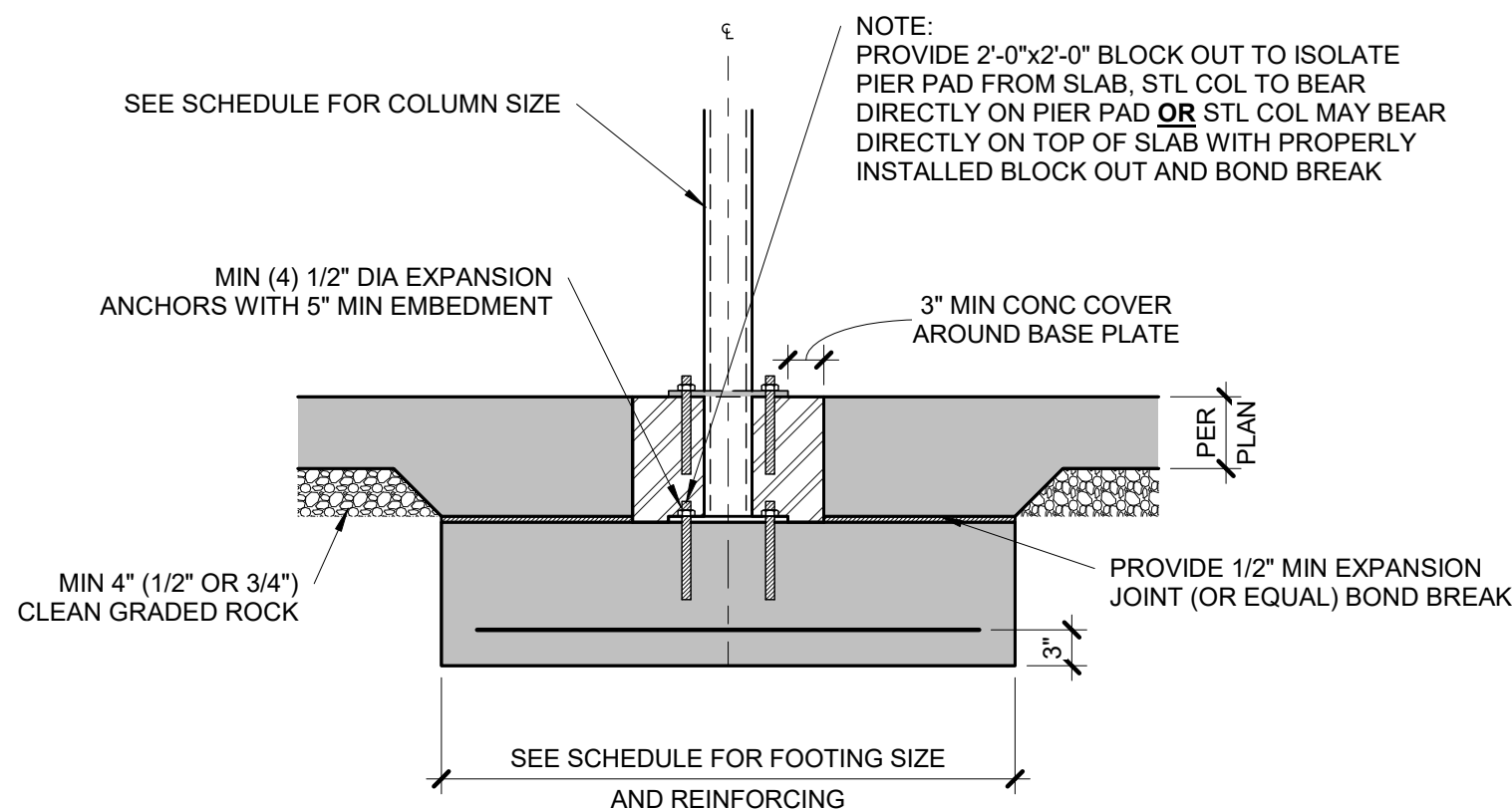
S2.0 3/4" = 1'-0"

#### COLUMN AND PIER PAD SCHEDULE

COLUMN MARK	PAD SIZE	REINFORCING	COL SIZE
A	30"x30"x12"	(4) #4 BARS E-W	3" SCH 40 (3.5" OD)
B	36"x36"x12"	(4) #4 BARS E-W	3" SCH 40 (3.5" OD)
C	42"x42"x12"	(5) #4 BARS E-W	3" SCH 40 (3.5" OD)
D	48"x48"x12"	(6) #4 BARS E-W	3 1/2" SCH 40 (4" OD)
E	54"x54"x16"	(8) #4 BARS E-W	REF PLAN
F	60"x60"x16"	(10) #4 BARS E-W	REF PLAN

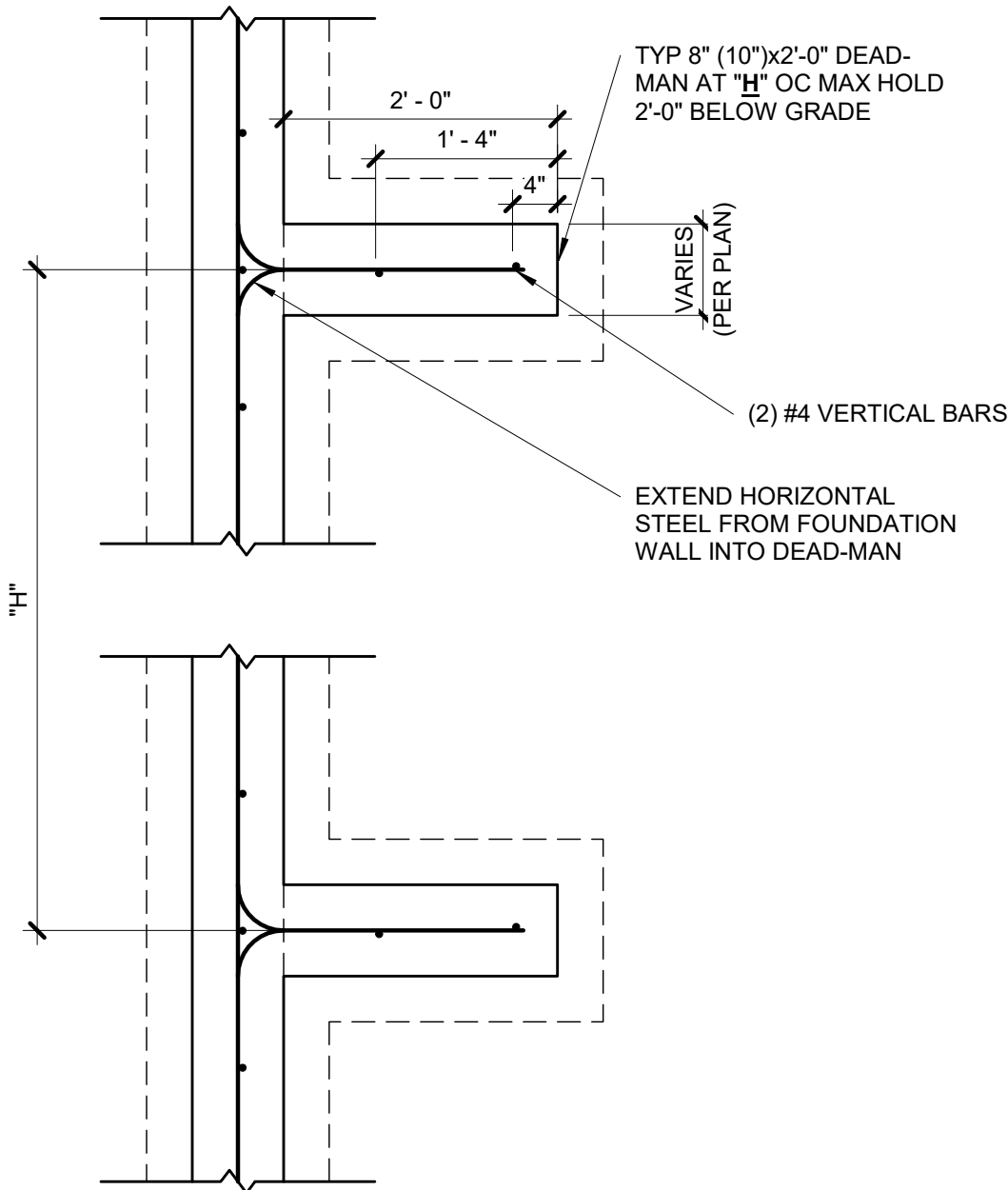
##### NOTES:

- COLUMN AND PIER PAD SIZES SHOWN ARE FOR MAXIMUM ADJUSTABLE COLUMN HEIGHT OF 9'-1". REQUIRES SEPARATE ENGINEERED DESIGN IF GREATER THAN 9'-1" TALL. COLUMNS SIZED AS QWIK-ADJUST COLUMN, BY QUALITY WAY PRODUCTS, LLC. REFER TO SAFE LOADING CAPACITIES PER MANUF SPECS, OR SUBSTITUTION TO ANOTHER PRODUCT ONLY WITH PRIOR APPROVAL BY APEX ENGINEERS.
- COLUMN AND PIER PAD SIZES SHOWN ARE BASED ON AN ASSUMED MINIMUM ALLOWABLE SOIL BEARING CAPACITY OF 2,000 PSF.



#### 5 COLUMN PAD DETAIL

S2.0 3/4" = 1'-0"

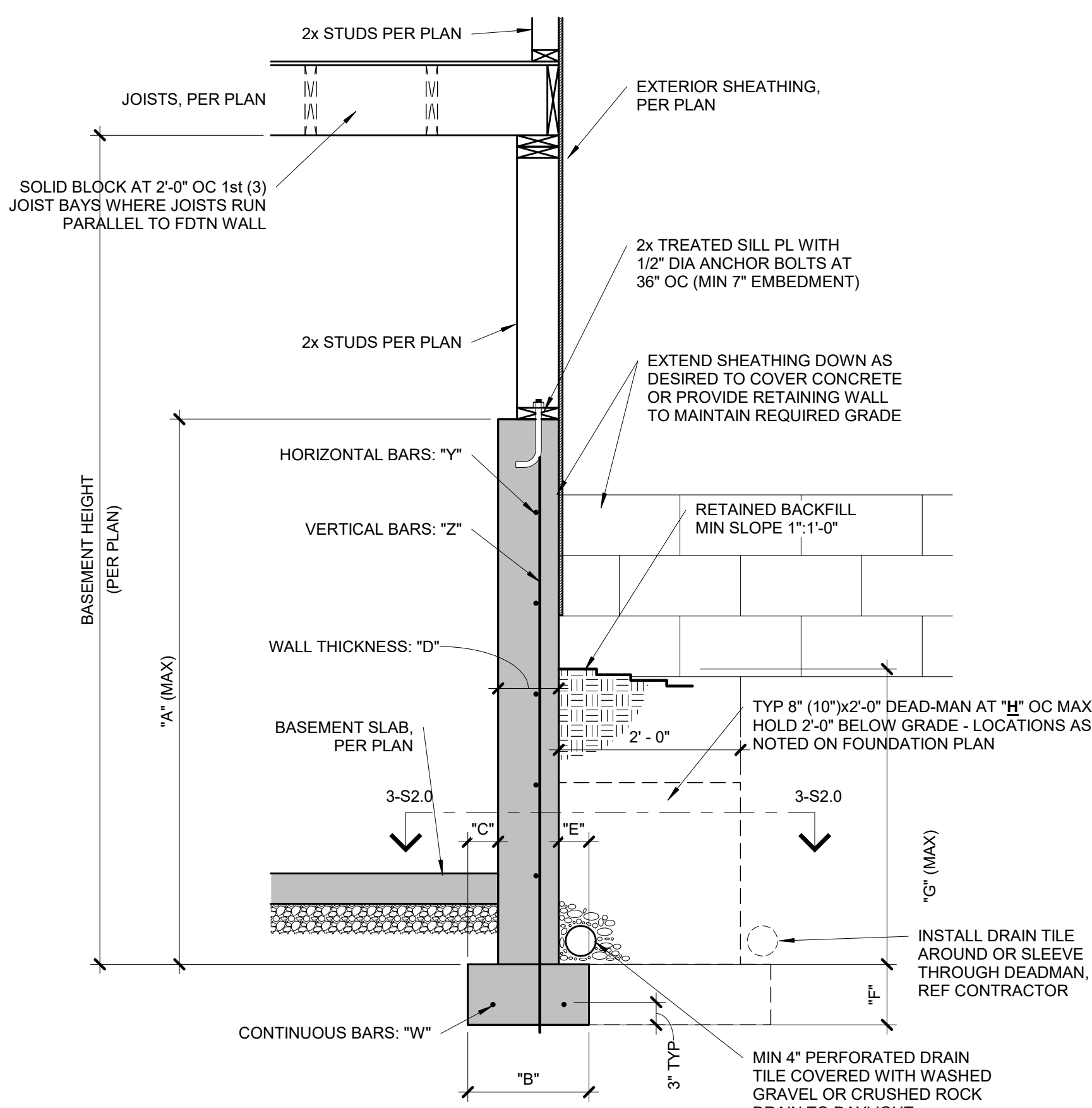


##### NOTES:

- MIN 3000 PSI FOOTING COMPRESSIVE CONCRETE STRENGTH.
- MIN 3000 PSI WALL COMPRESSIVE CONCRETE STRENGTH.
- AIR ENTRAINMENT BETWEEN 5% & 7% OF CONCRETE VOLUME.
- GRADE 40 REINFORCING STEEL UNLESS OTHERWISE NOTED.
- LAP SPLICES 24" MIN
- WALL SHALL BE BACK-FILLED WITH CLEAN, LEAN CLAY (OR BETTER) LOW VOLUME CHANGE MATERIAL. ON-SITE MATERIAL MAY BE USED IF DEEMED ACCEPTABLE BY THE GEOTECHNICAL ENGINEER.
- ASSUMED 2,000 PSF BEARING (TO BE VERIFIED BY GEOTECHNICAL ENGINEER).

#### 3 TYPICAL DEAD-MAN SECTION

S2.0 3/4" = 1'-0"



#### CONCRETE DIMENSIONS

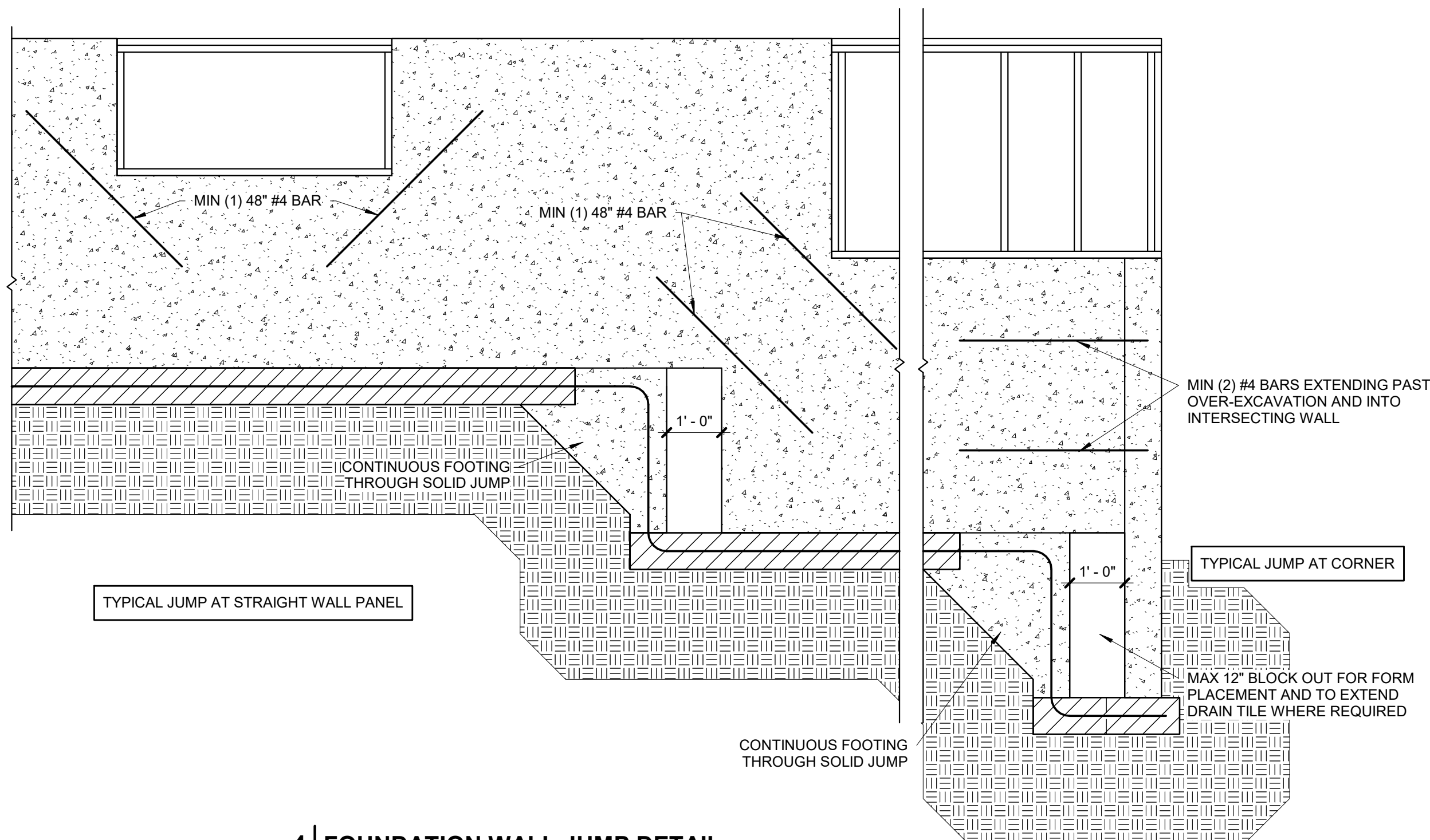
"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"
4'-0"	1'-4"	4"	8"	4"	8"	3'-4"	20'-0"
6'-0"	1'-4"	4"	8"	4"	8"	4'-4"	20'-0"
9'-0"	1'-8"	5"	8"	4"	8"	4'-4"	20'-0"

##### NOTES:

- DIMENSION SHOWN IS FOR MAXIMUM UNINTERRUPTED WALL PANEL LENGTH BEFORE A DEAD-MAN SHALL BE INSTALLED. NOTE: A MINIMUM 2'-0" RETURN OR OFFSET IN THE FOUNDATION WALL SHALL SUBSTITUTE AS A DEAD-MAN AND/OR BREAK IN THE WALL PANEL LENGTH.
- VERTICAL REINFORCING STEEL TO EXTEND TO WITHIN 8" OF TOP WALL. MINIMUM (1) #4 HORIZONTAL BAR WITHIN 12" OF TOP AND BOTTOM OF WALL.
- THE BASEMENT SLAB IS AN INTEGRAL PART OF THE 'UNRESTRAINED' FOUNDATION WALL DESIGN THEREFORE, IF THE WALL IS BACKFILLED PRIOR TO PLACEMENT OF THE BASEMENT SLAB, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY BRACING THE WALL UNTIL THE BASEMENT SLAB HAS BEEN PLACED.

#### 2 TYPICAL 'UNRESTRAINED' FOUNDATION WALL DETAIL

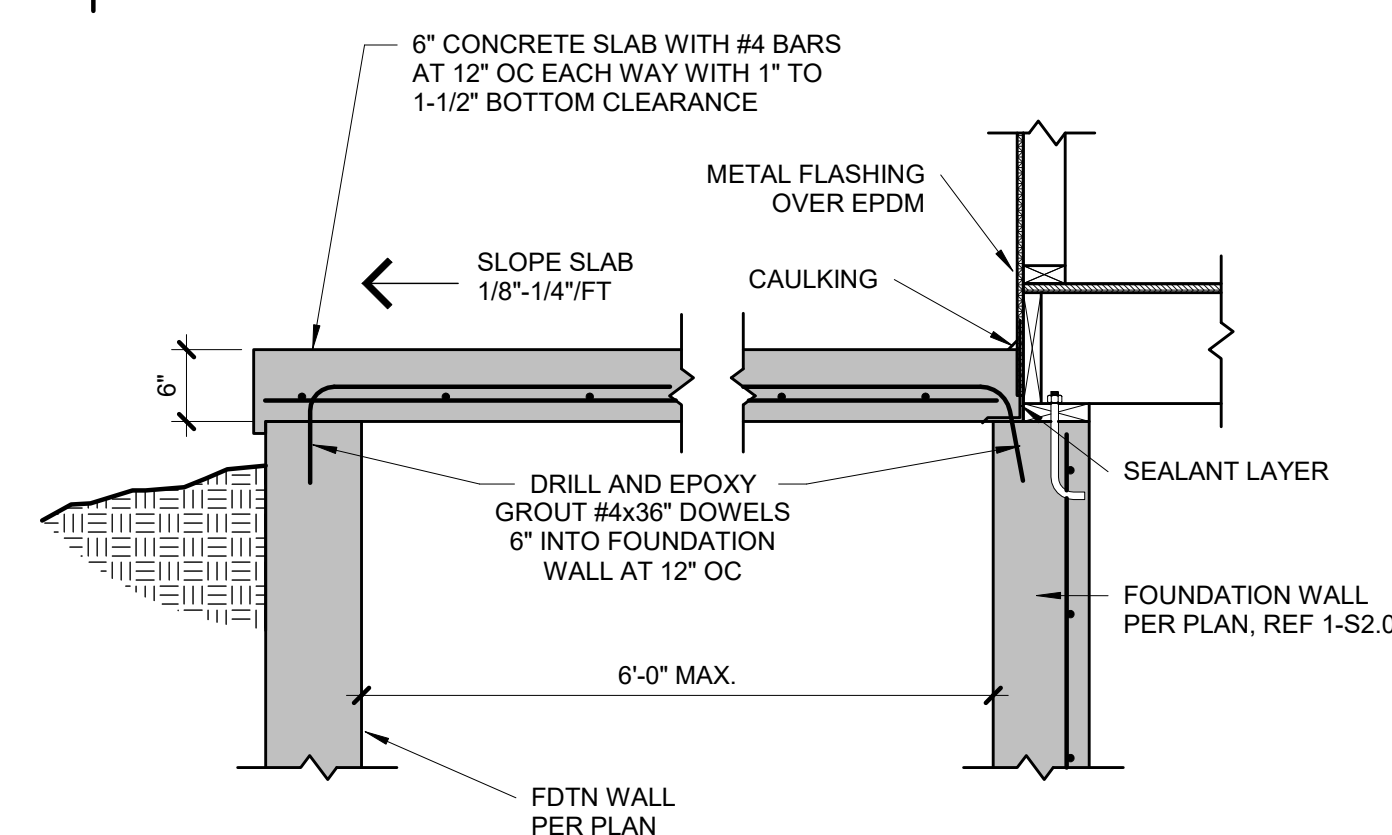
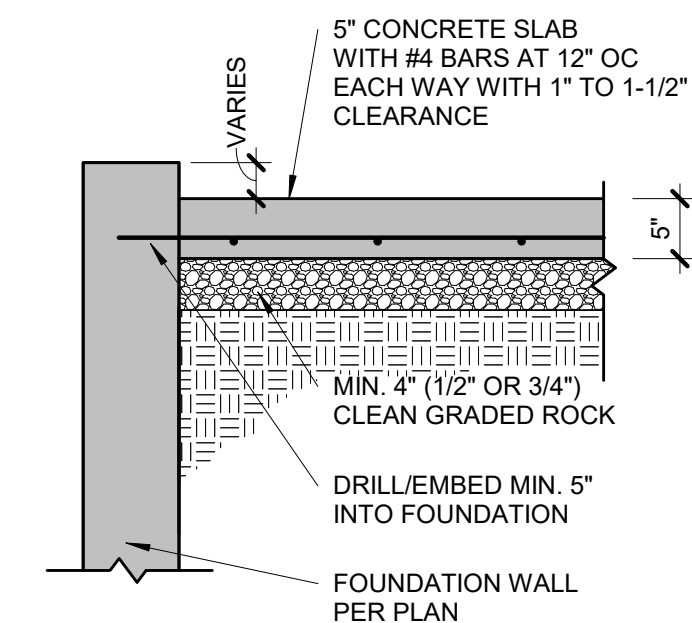
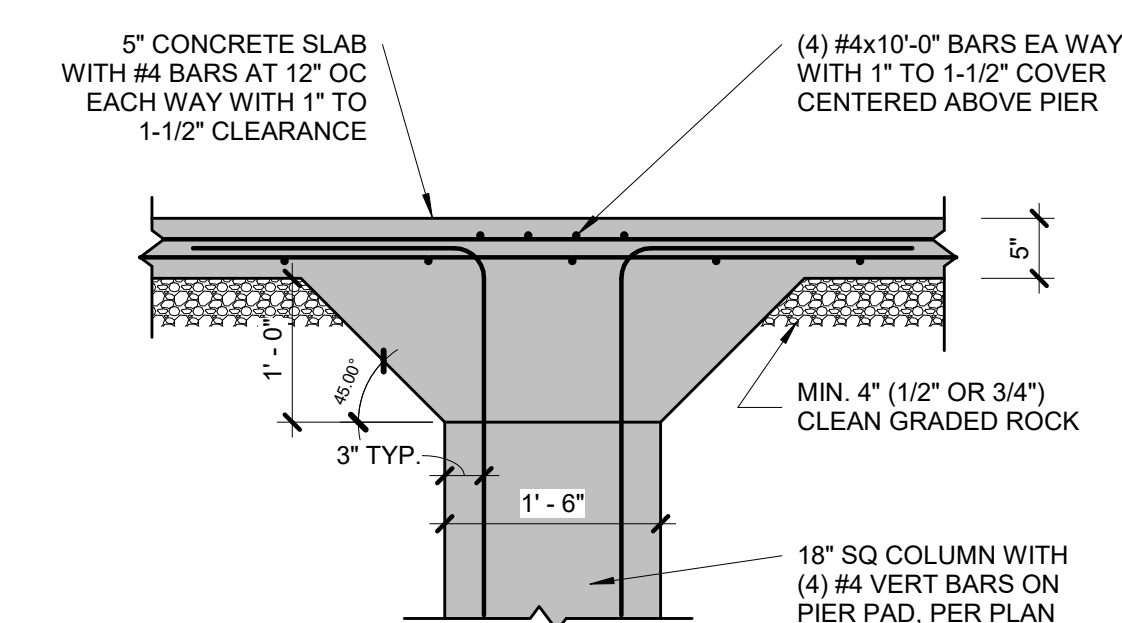
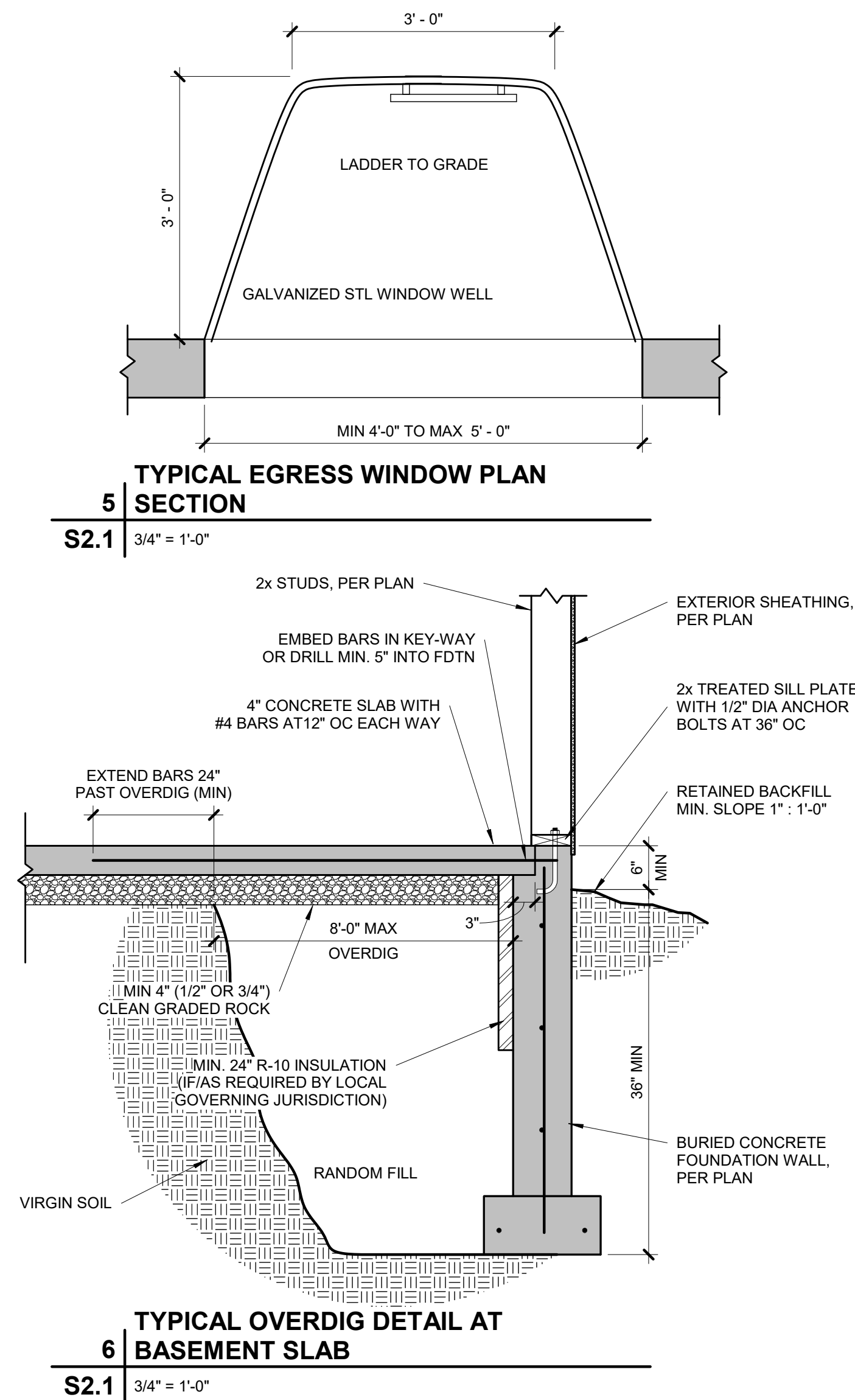
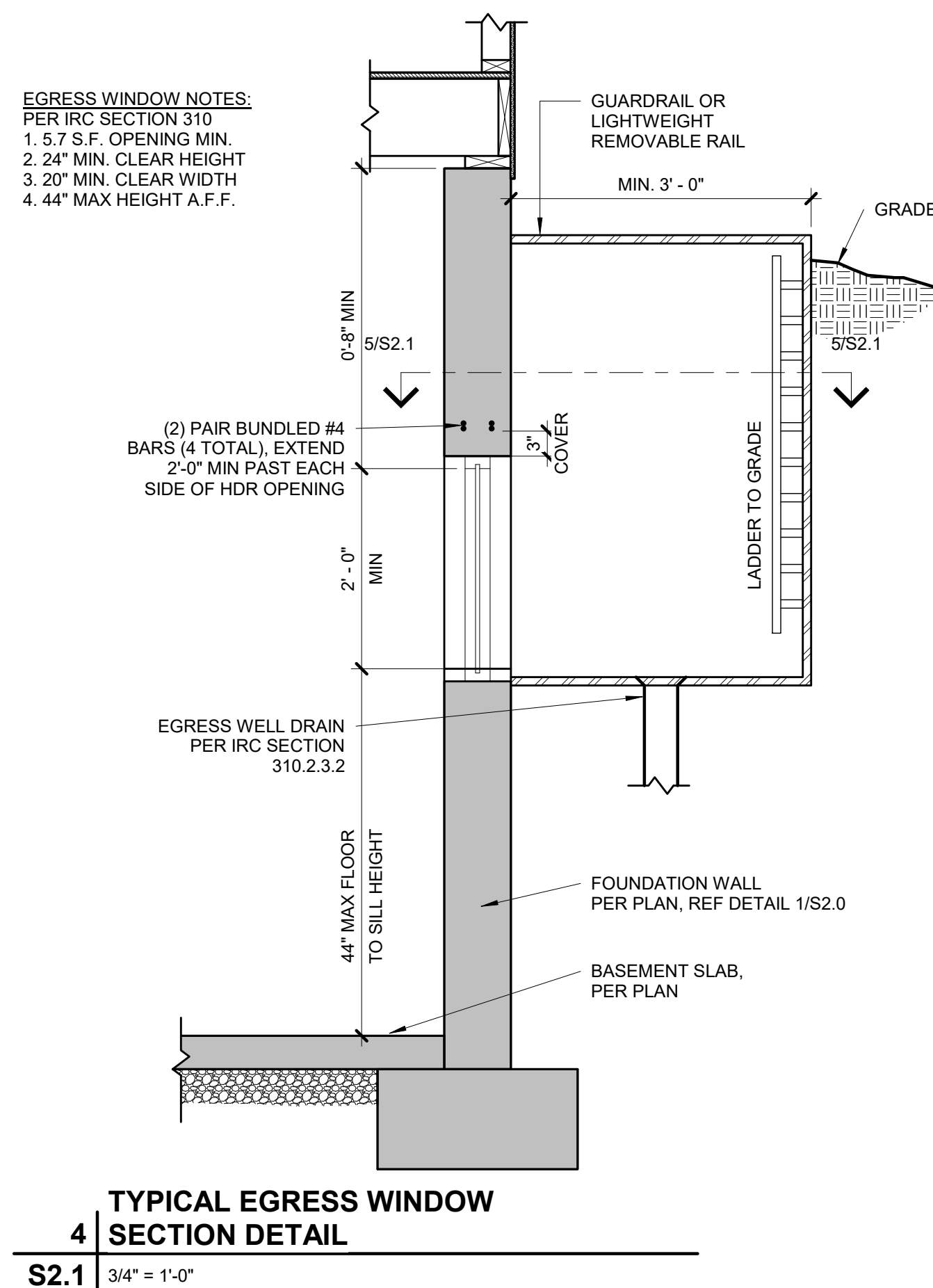
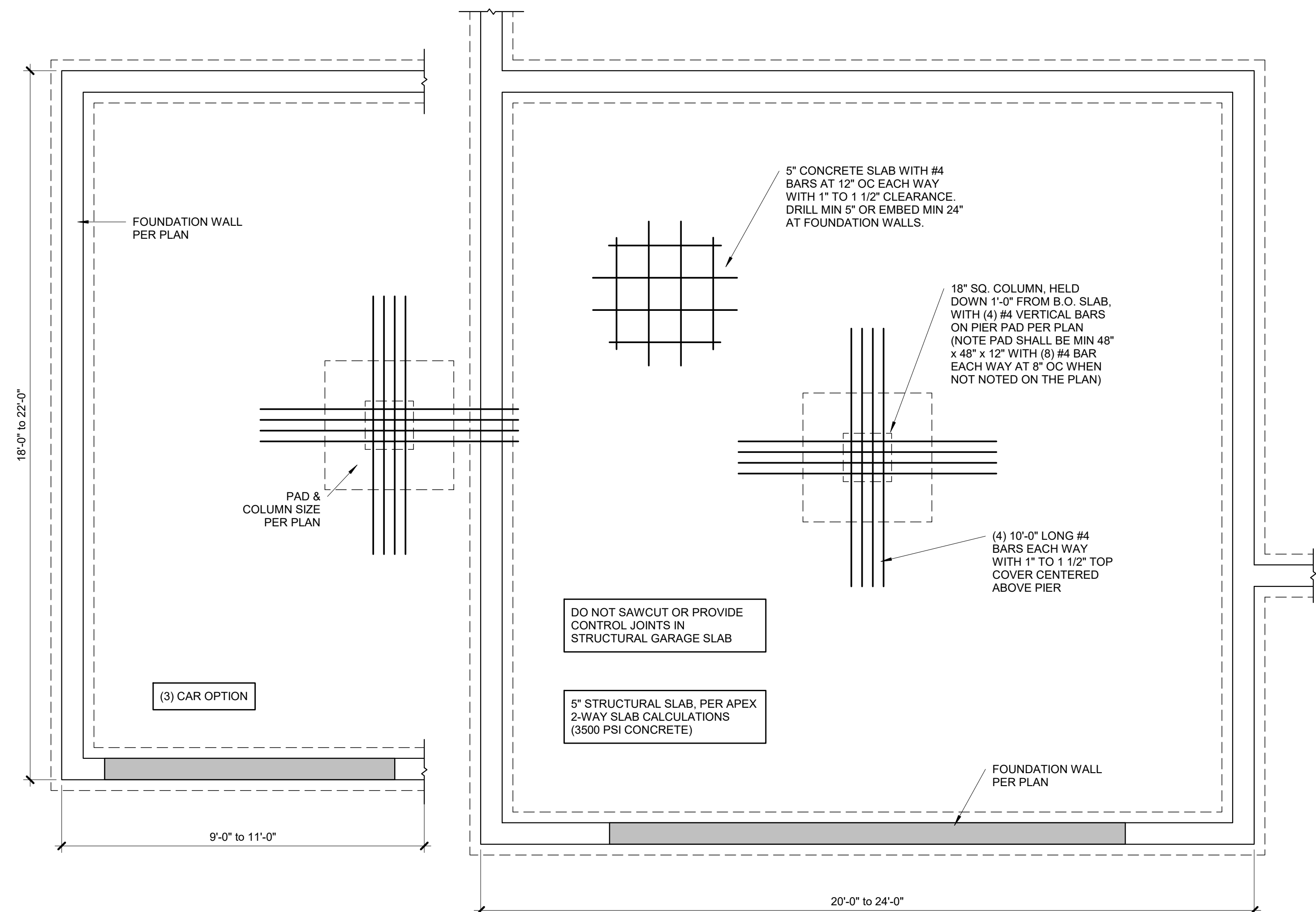
S2.0 3/4" = 1'-0"



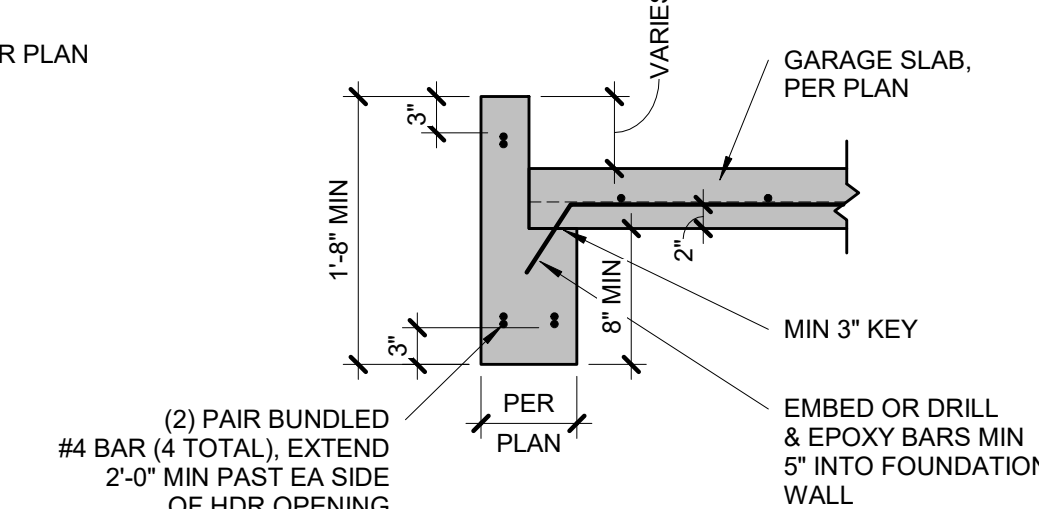
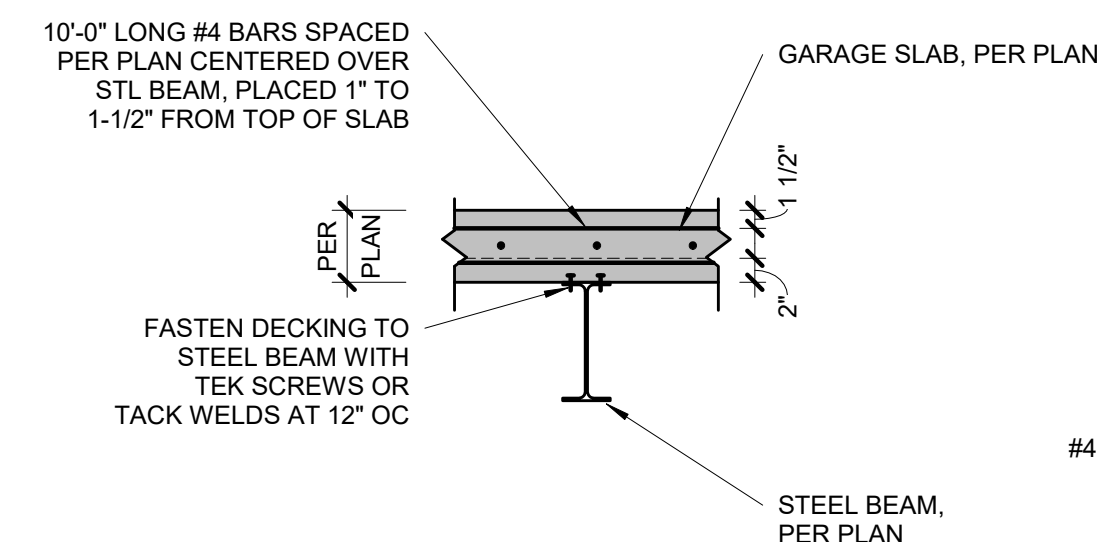
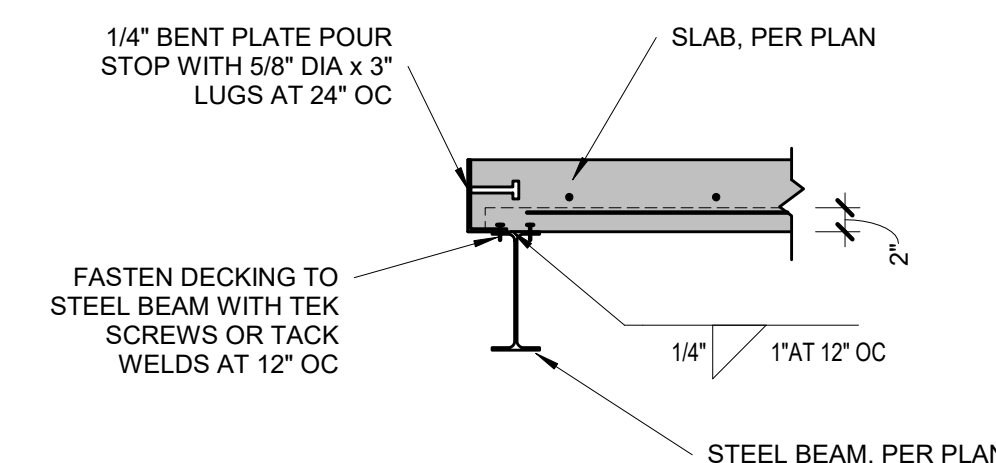
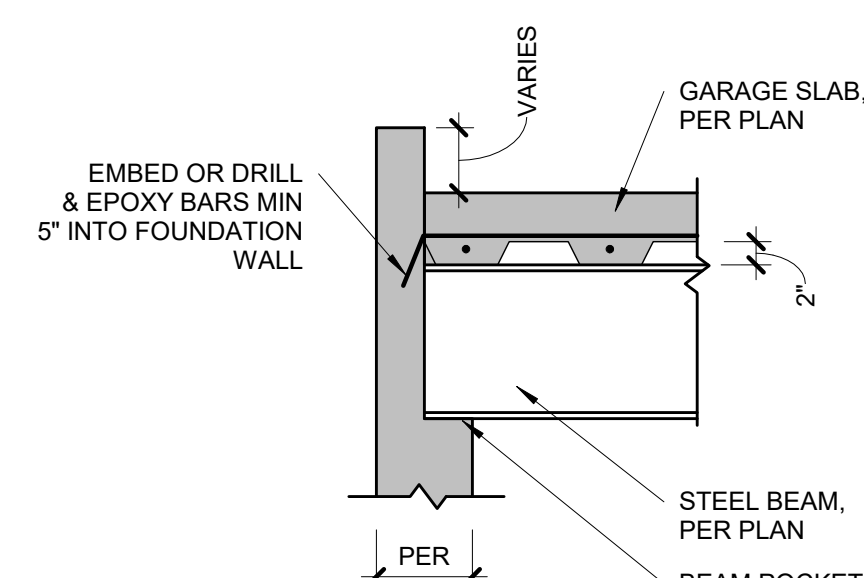
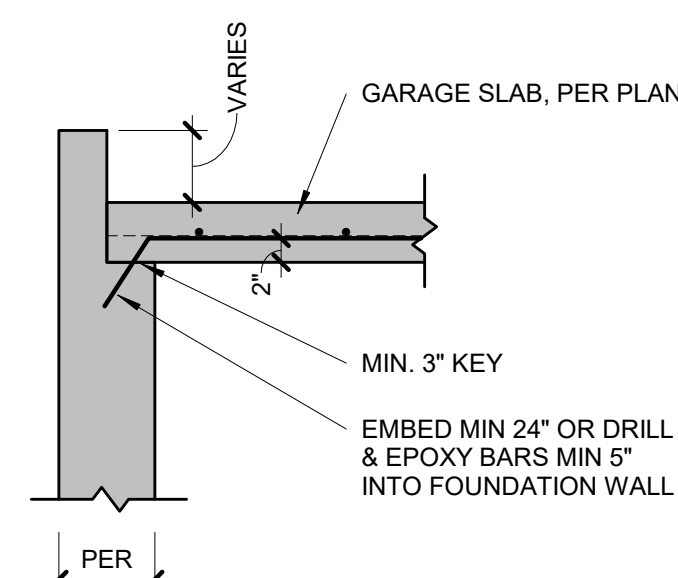
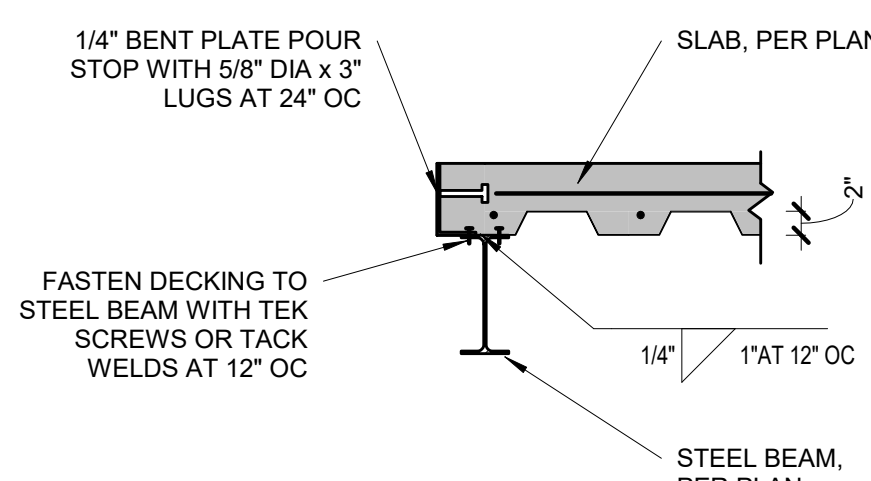
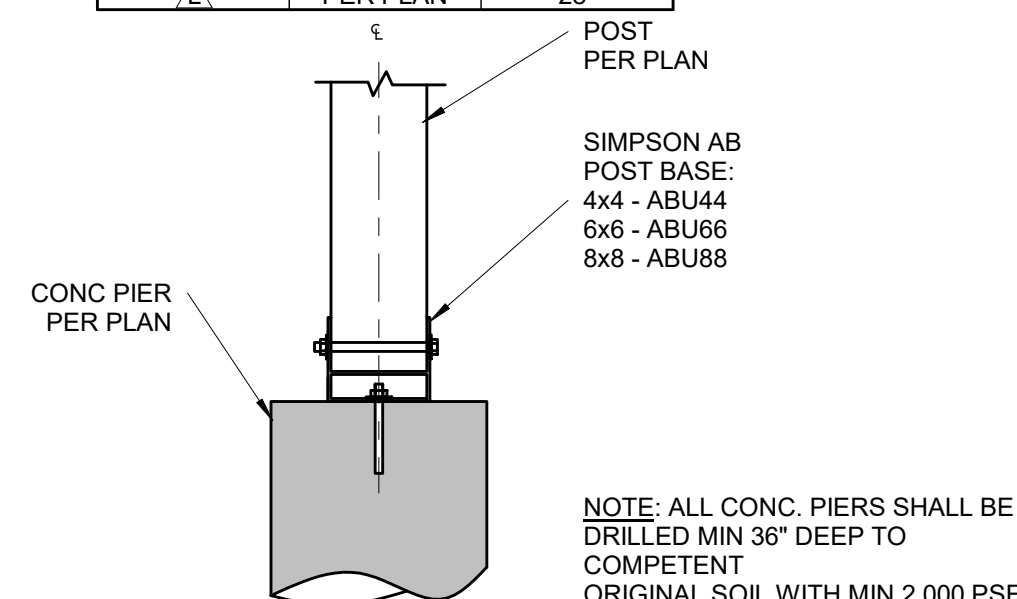
#### 4 FOUNDATION WALL JUMP DETAIL

S2.0 1/2" = 1'-0"

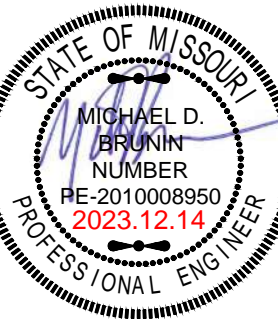




PIER SCHEDULE		
COLUMN MARK	COL SIZE	PIER DIAMETER
G	PER PLAN	12"
H	PER PLAN	16"
J	PER PLAN	18"
K	PER PLAN	24"
L	PER PLAN	28"



  
1625 LOCUST ST  
KANSAS CITY, MO 64108  
816.421.3222  
[www.apex-engineers.com](http://www.apex-engineers.com)



STRUCTURAL DESIGN REVIEW  
KANSAS ENGINEERING LICENSE:  
E-992  
MISSOURI ENGINEERING LICENSE  
2003004673

**PROJECT:**  
27773 S.W. 11th Street  
Highland Meadows - Lot 184  
Lee's Summit, Missouri

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**CLIENT:**  
New Mark Homes

CLIENT: New Mark Homes

PROJECT #:	23-2017
DRAWN BY:	TDA
CHECKED BY:	BDC
SUBMITTAL DATE:	2023.12.14

COMMENTS

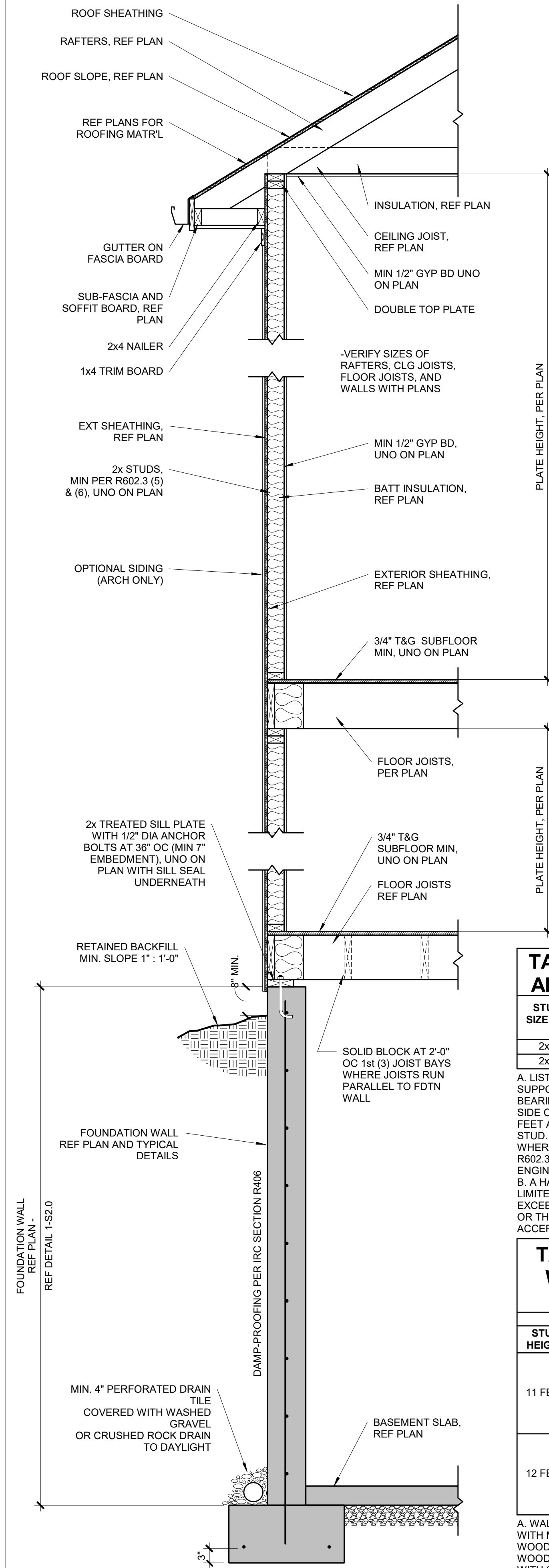
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SHEET:

## FOUNDATION DETAILS

## S2.1





**TABLE R602.3 (5) - SIZE, HEIGHT, AND SPACING OF WOOD STUDS\***

STUD SIZE (IN)	LATERALLY UNSUPPORTED STUD HEIGHT*	STRUCTURE SUPPORTED		
		ROOF ONLY	ROOF AND (1) FLOOR	ROOF AND (2) FLOORS
2x4	10 FEET	24" OC <sup>B</sup>	16" OC <sup>C</sup>	N/A
2x6	10 FEET	24" OC	24" OC	16" OC

A. LISTED HEIGHTS ARE DISTANCES BETWEEN POINTS OF LATERAL SUPPORT PLACED PERPENDICULAR TO THE PLANE OF THE WALL. BEARING WALLS SHALL BE SHEATHED ON NOT LESS THAN ONE SIDE OR BRIDGING SHALL BE INSTALLED NOT GREATER THAN 4 FEET APART MEASURED VERTICALLY FROM EITHER END OF THE STUD. INCREASES IN UNSUPPORTED HEIGHT ARE PERMITTED WHERE IN THE COMPLIANCE WITH EXCEPTION 2 OF SECTION R602.3.1 OR DESIGNED IN ACCORDANCE WITH ACCEPTED ENGINEERING PRACTICE.

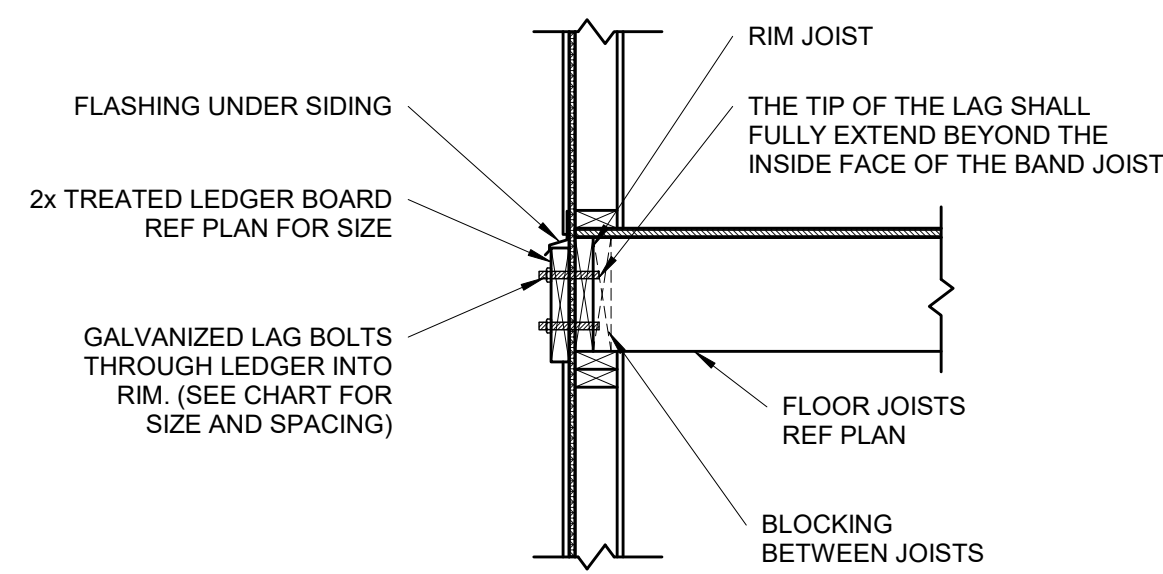
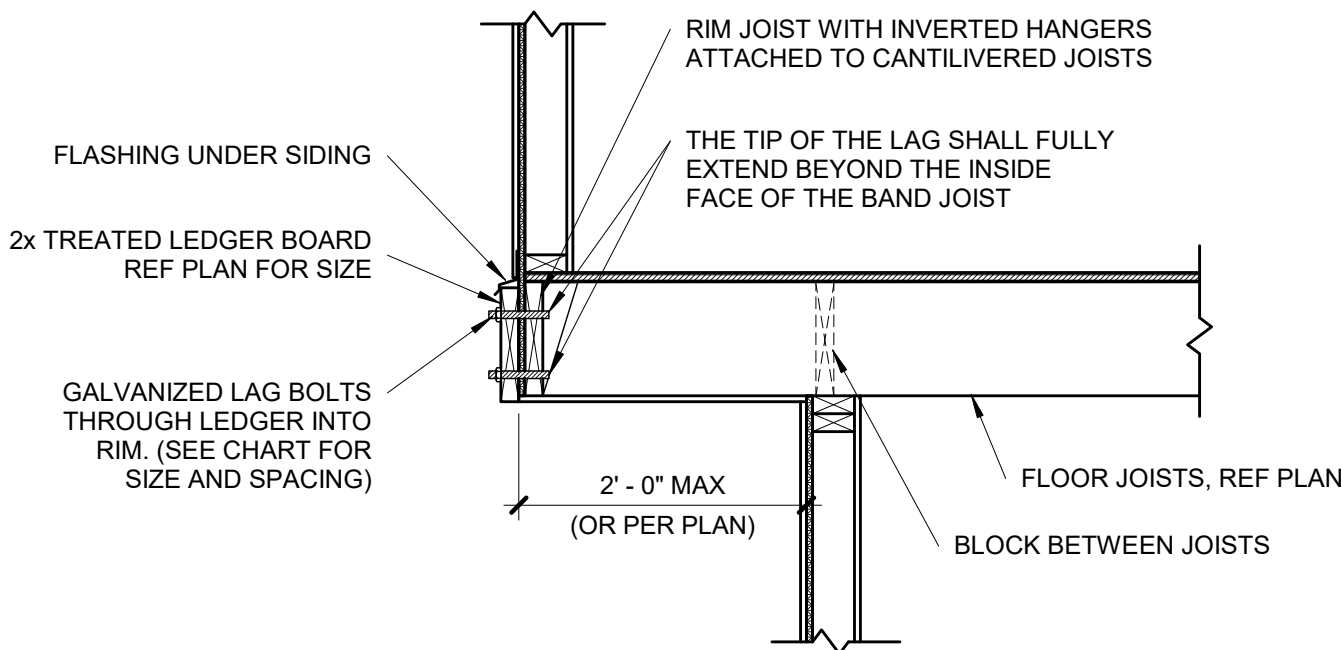
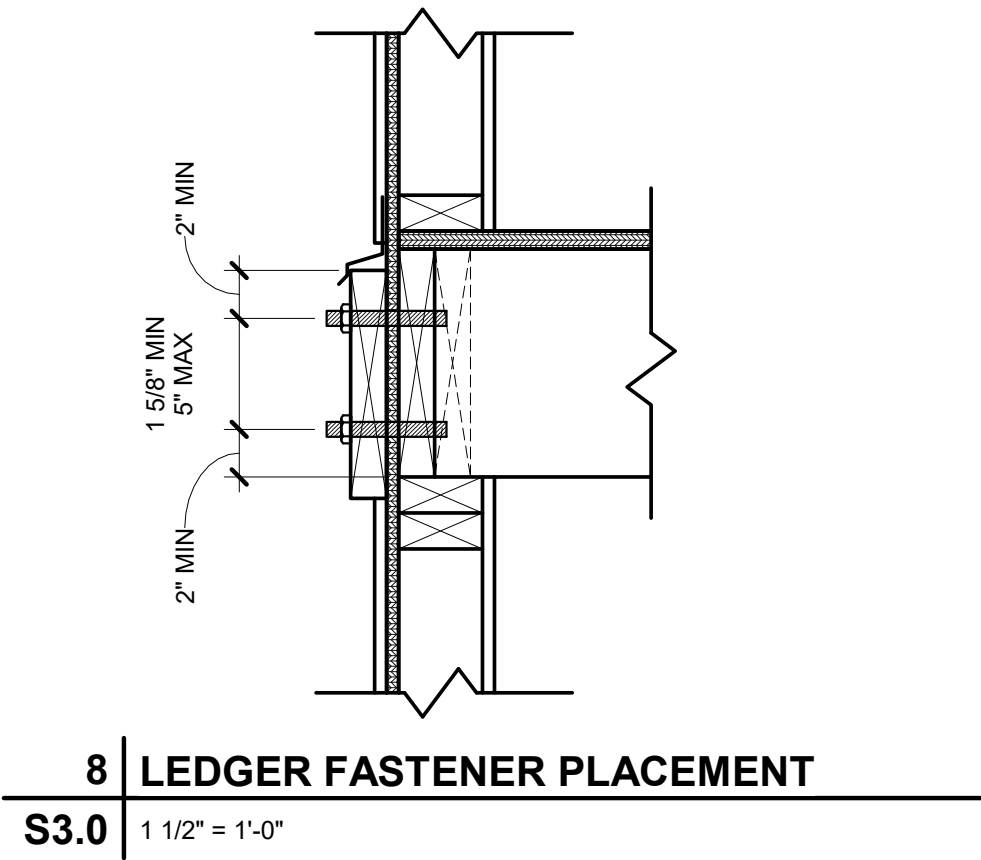
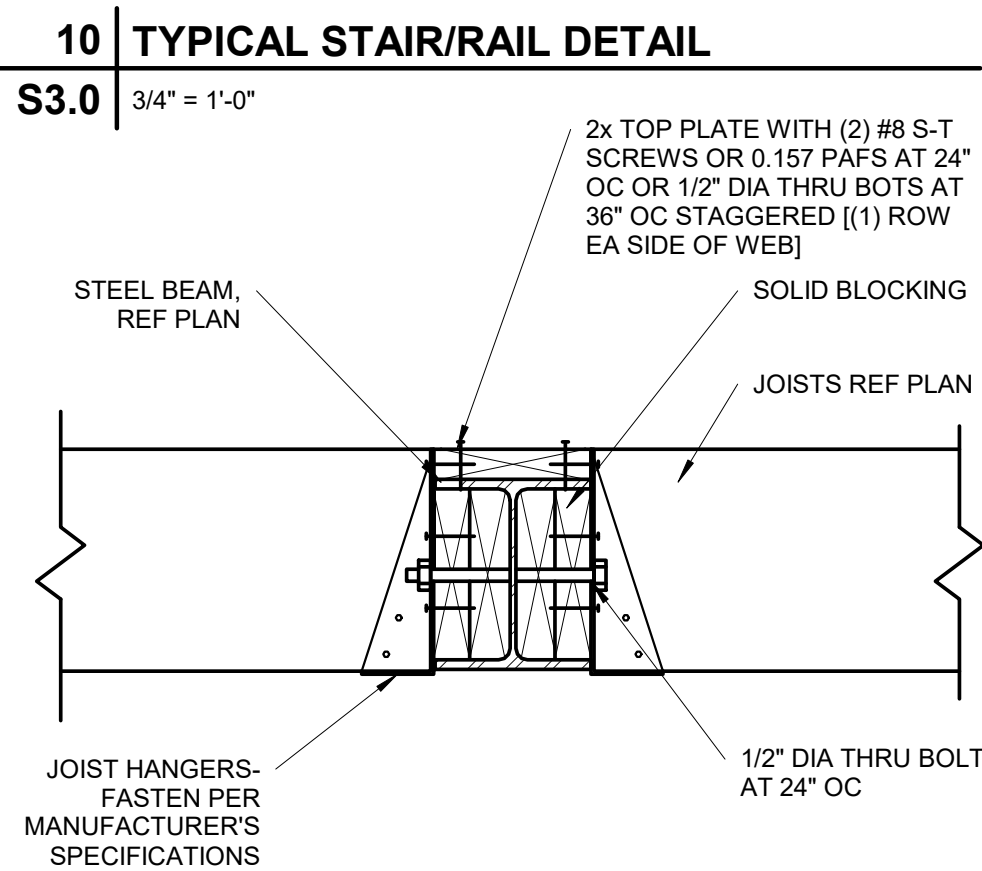
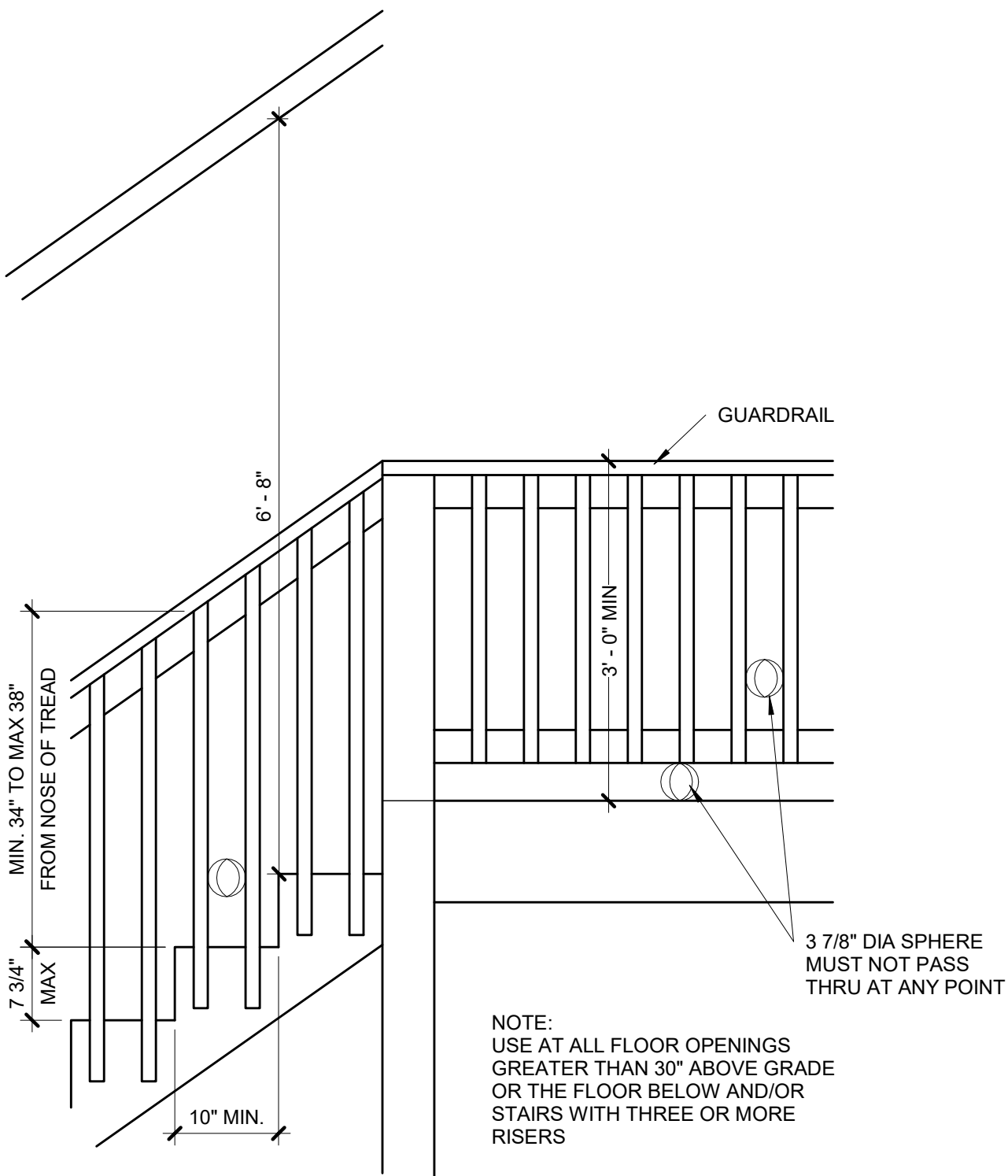
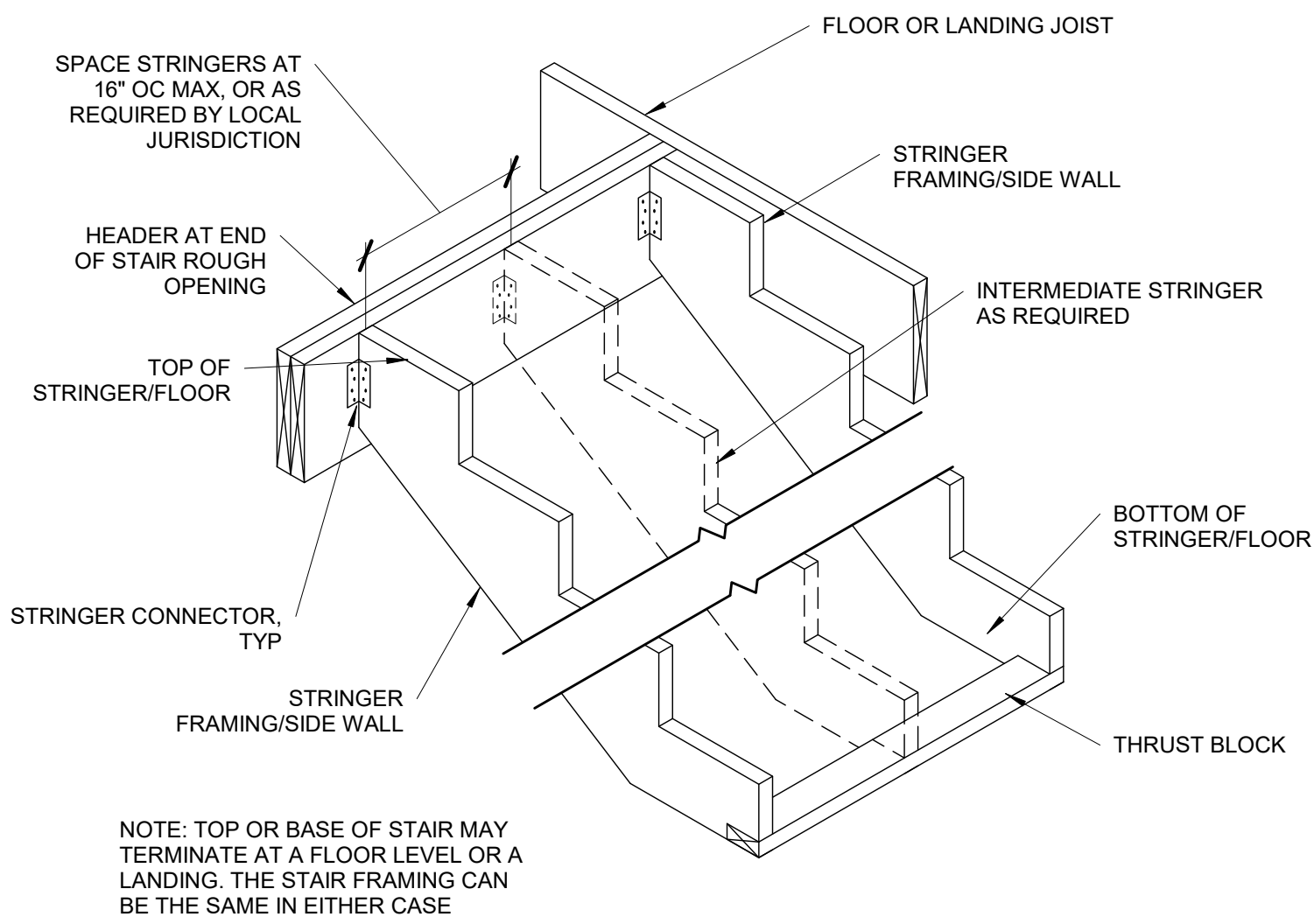
B. A HABITABLE ATTIC ASSEMBLY SUPPORTED BY 2x4 STUDS IS LIMITED TO A ROOF SPAN OF 32 FEET. WHERE THE ROOF SPAN EXCEEDS 32 FEET, THE WALL STUDS SHALL BE INCREASED TO 2x6 OR THE STUDS SHALL BE DESIGNED IN ACCORDANCE WITH ACCEPTED ENGINEERING PRACTICE.

**TABLE R602.3 (6) - ALTERNATE WOOD BEARING WALL STUD SIZE, HEIGHT AND SPACING**

ULTIMATE DESIGN WIND SPEED = 115 MPH				
STUD HEIGHT	SUPPORTING	STUD SPACING,	MAX ROOF/FLOOR SPAN,	
			12 FEET	24 FEET
11 FEET	ROOF ONLY	12 IN	2x4	2x4
		16 IN	2x4	2x4
	ROOF AND ONE FLOOR	24 IN	2x6	2x6
		12 IN	2x4	2x6
12 FEET	ROOF ONLY	12 IN	2x4	2x4
		16 IN	2x4	2x6
	ROOF AND ONE FLOOR	24 IN	2x6	2x6
		12 IN	2x4	2x6

A. WALL STUDS NOT EXCEEDING 16" OC SHALL BE SHEATHED WITH MINIMUM 1/2" GYPSUM BOARD ON THE INTERIOR AND 3/8" WOOD STRUCTURAL PANEL SHEATHING ON THE EXTERIOR. WOOD STRUCTURAL PANEL SHEATHING SHALL BE ATTACHED WITH 8d (2.5" x 0.131") NAILS NOT GREATER THAN 6" OC ALONG PANEL EDGES AND 12" OC AT INTERMEDIATE SUPPORTS, AND ALL PANEL JOINTS SHALL OCCUR OVER STUDS OR BLOCKING.

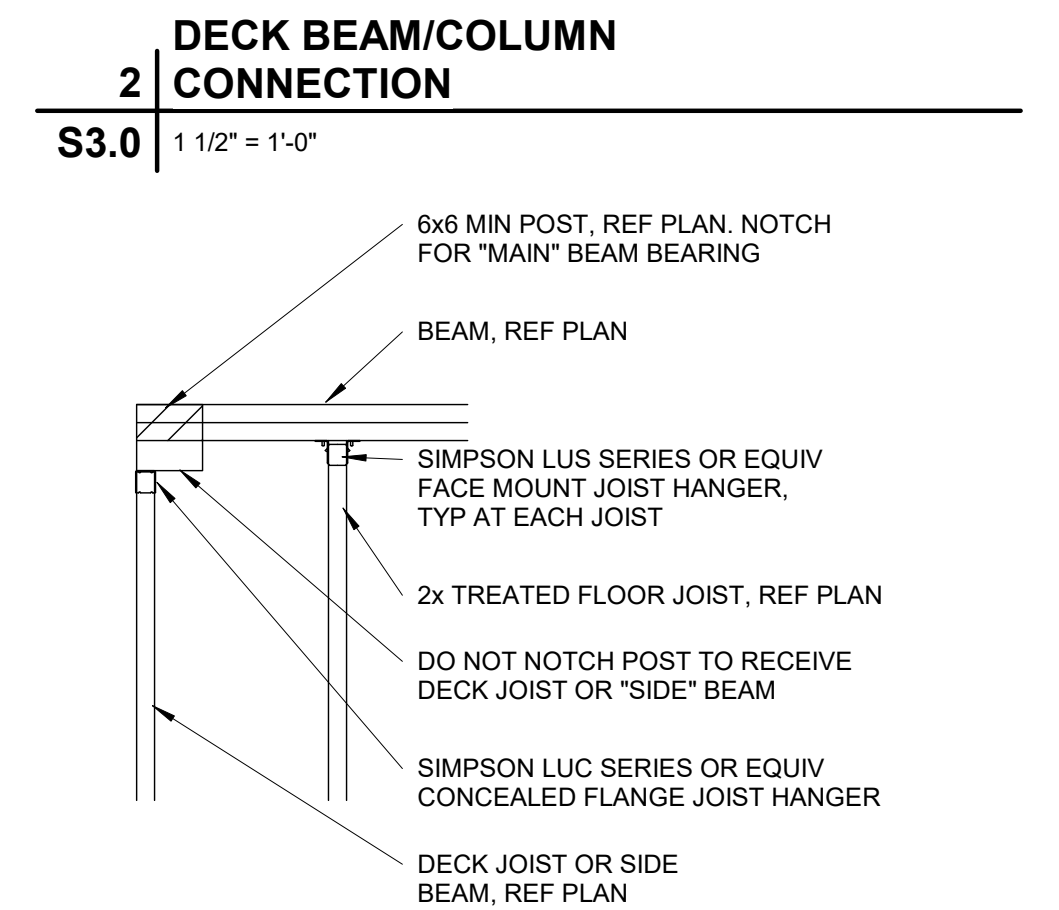
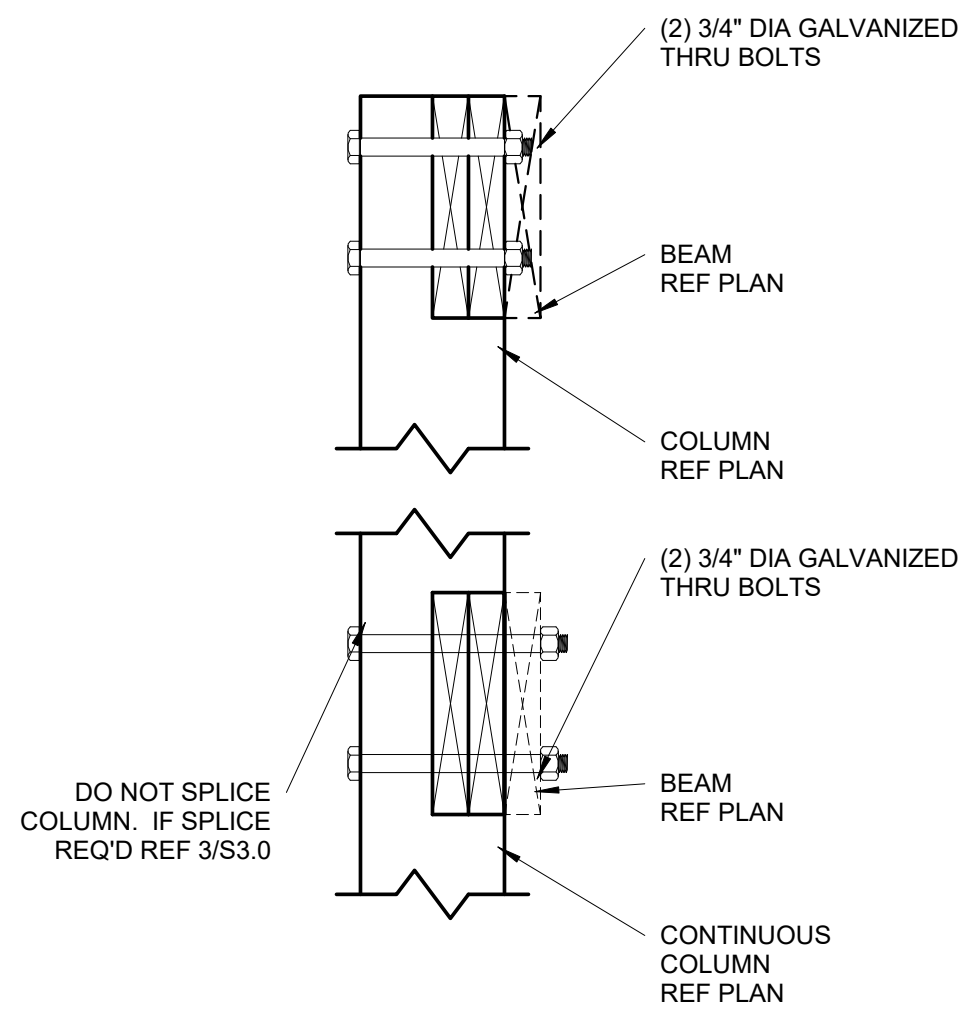
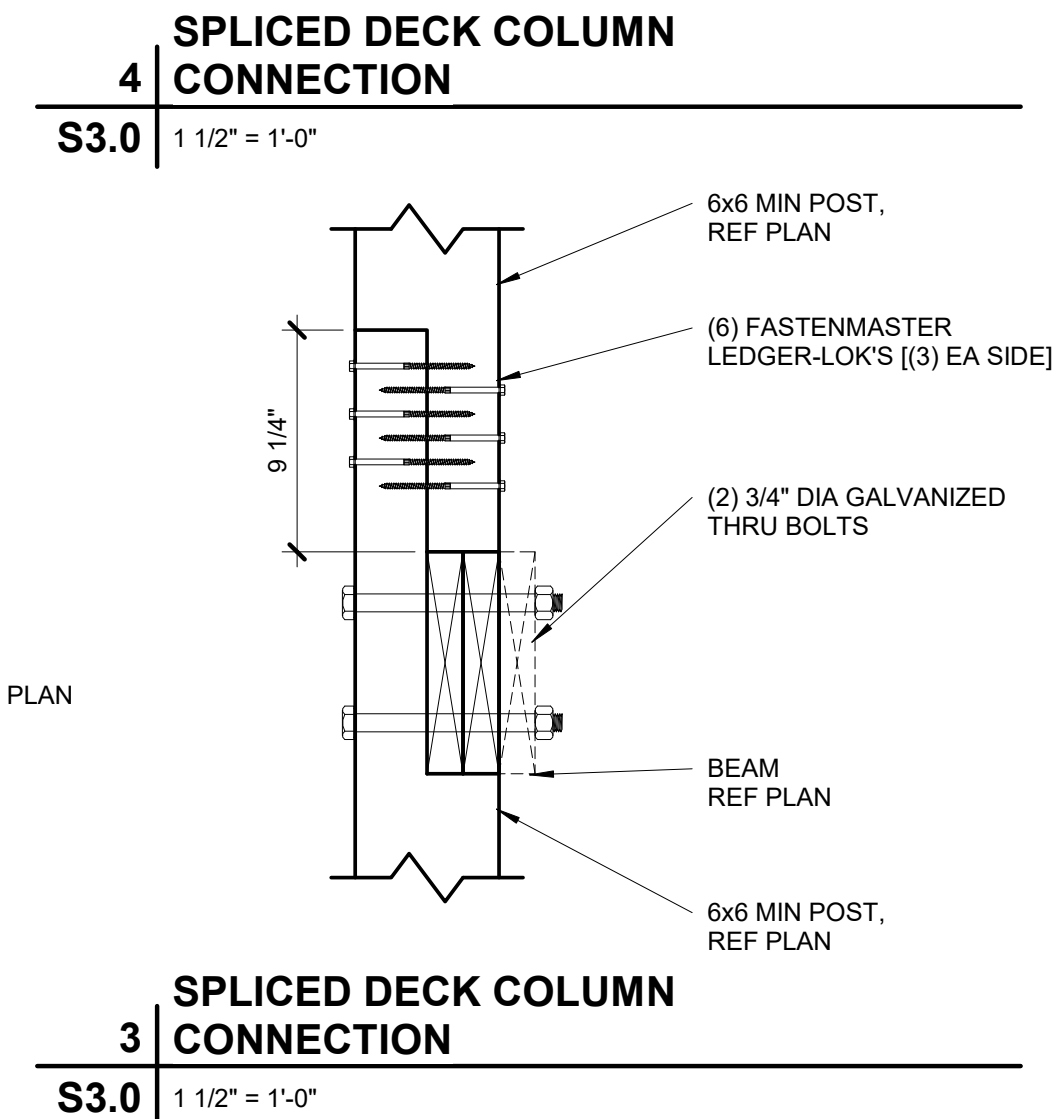
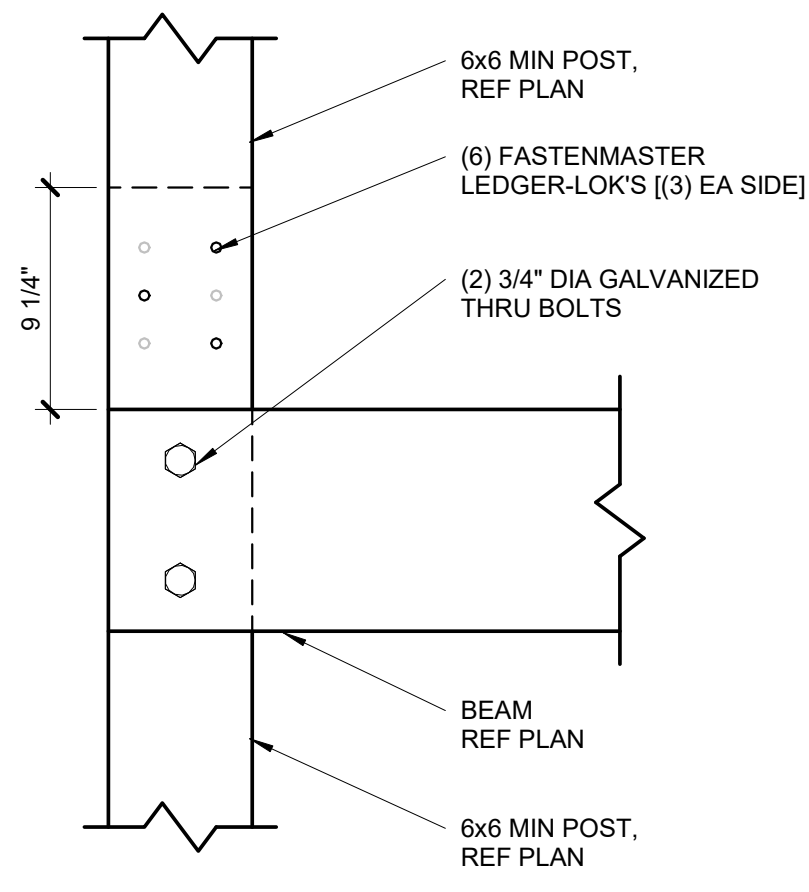
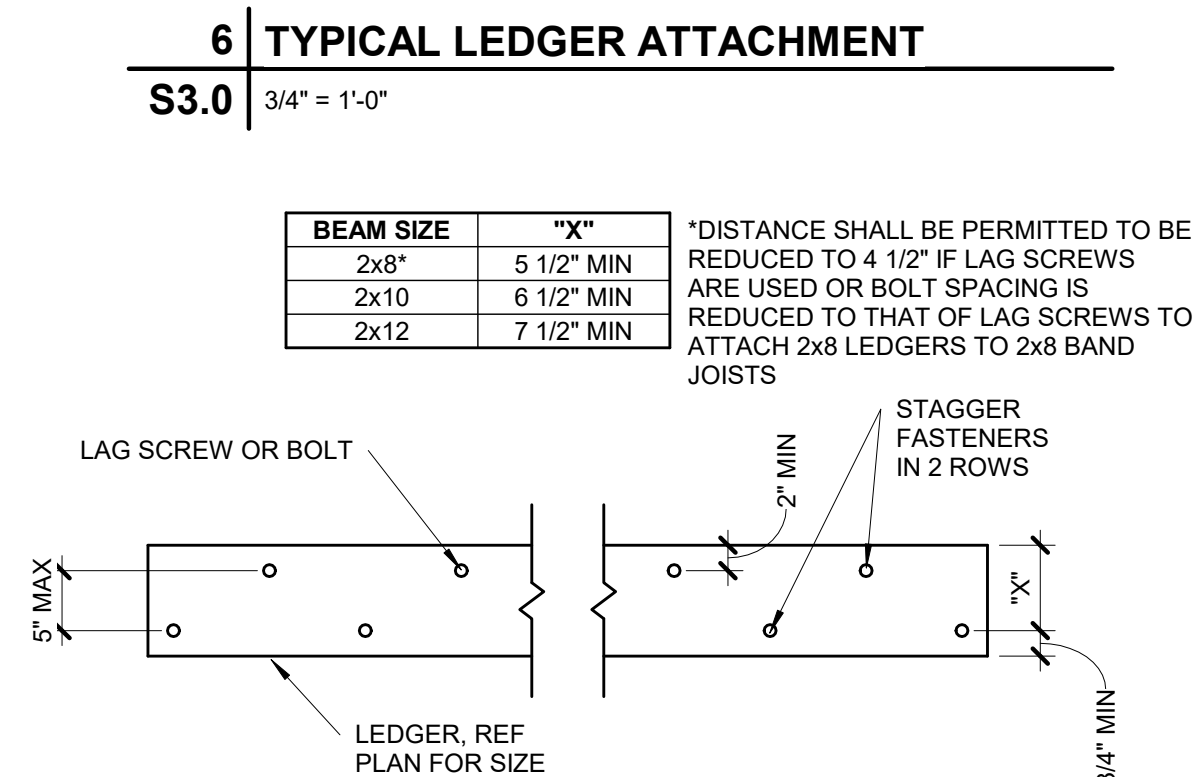
B. THE MAXIMUM SPAN IS APPLICABLE TO BOTH SINGLE AND MULTIPLE SPAN ROOF AND FLOOR CONDITIONS. THE ROOF ASSEMBLY SHALL NOT CONTAIN A HABITABLE ATTIC.



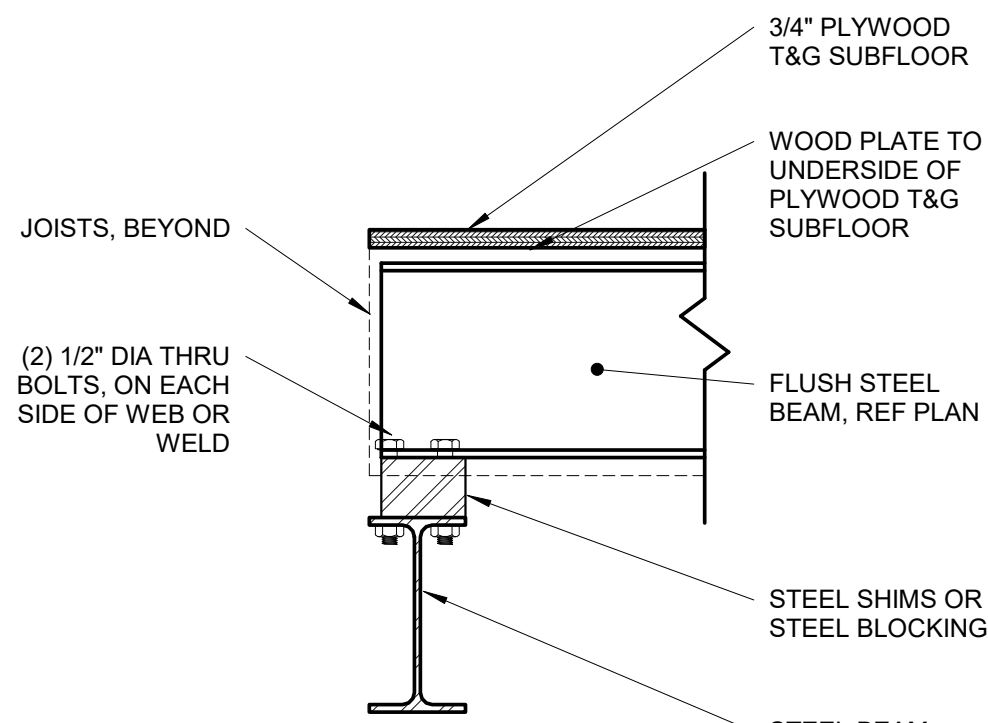
**DECK LEDGER ATTACHMENT CHART**

DECK JOIST SPAN	1/2" DIA LAG SPACING	EQUIVALENT SPACING FOR 16" OC JOIST BAYS
UP TO 10'-0"	16" OC	N/A
10'-1" TO 12'-0"	15" OC	16" OC DBL EVERY OTHER
12'-1" TO 14'-0"	13" OC	16" OC DBL EVERY OTHER
14'-1" TO 16'-0"	11" OC	16" OC DBL EVERY JOIST BAY
16'-1" TO 18'-0"	10" OC	16" OC DBL EVERY JOIST BAY

NOTE: CHART IS APPLICABLE ONLY WHEN DECK IS SHOWN ON APPROVED PLAN.

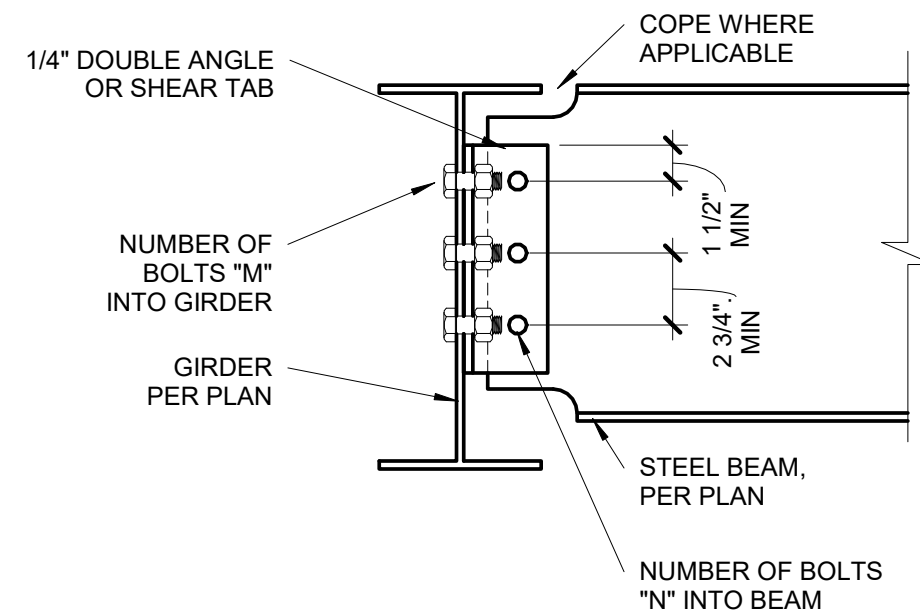






#### 4 FLUSH STEEL BEAM TO STEEL BEAM

S3.1 1 1/2" = 1'-0"



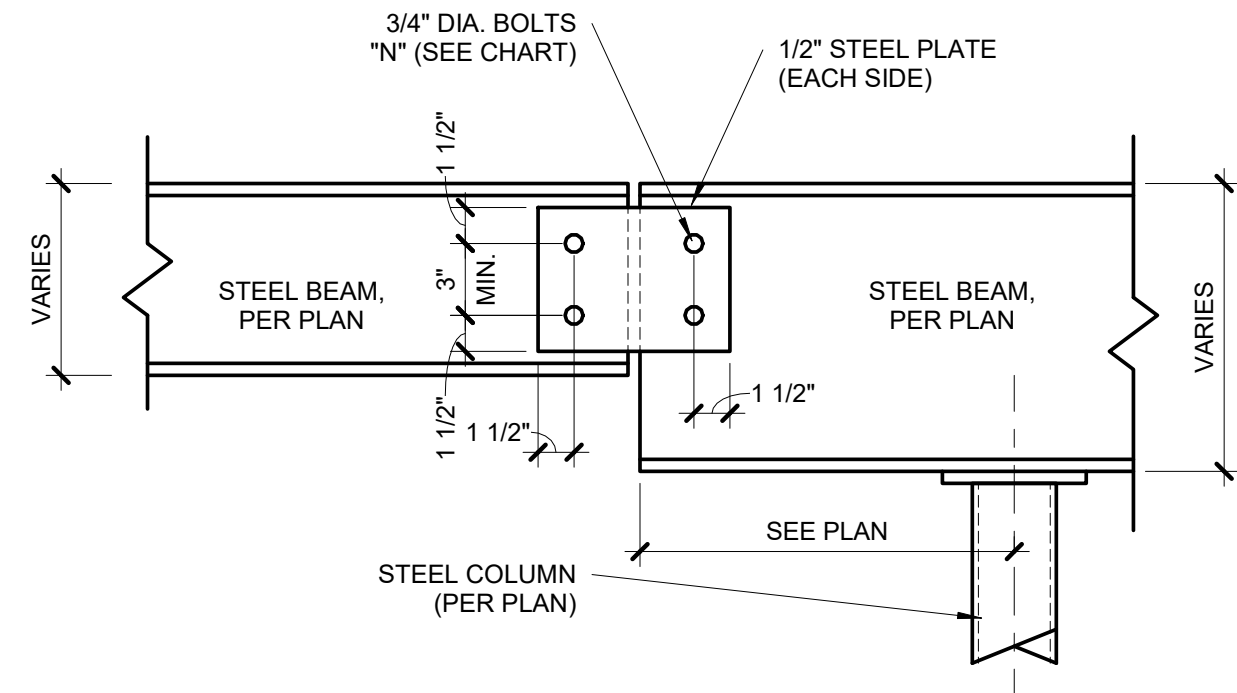
#### 3 BEAM TO GIRDER CONNECTION

S3.1 1 1/2" = 1'-0"

##### BEAM CONNECTION SCHEDULE

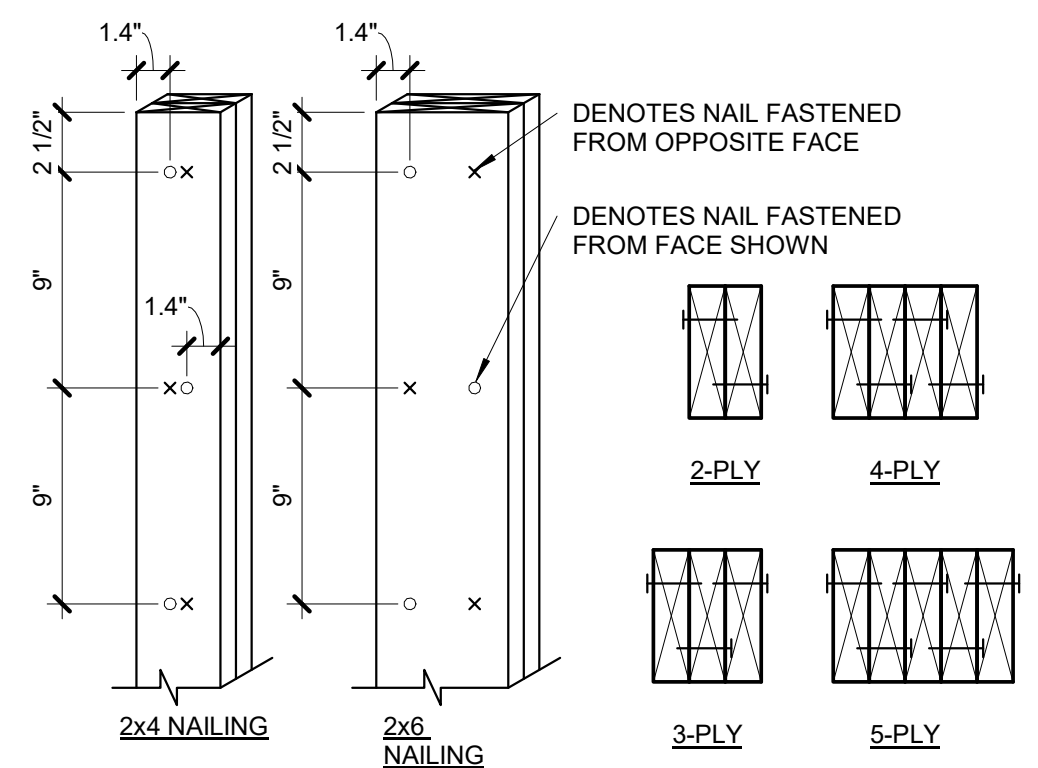
BEAM SIZE	# OF BOLTS "N"	# OF BOLTS "M"
W8, W10	2	4
W12, W14	3	6
W16, W18	4	8

NOTES:  
1. THESE CONNECTIONS ARE TYPICAL, UNO.  
2. NUMBER OF BOLTS IN UPSET BEAM CONNECTIONS DETERMINED BY SMALLER OF TWO BEAMS AT CONNECTION.  
3. ALL AROUND 1/4" FILLET WELD MAY BE SUBSTITUTED FOR EITHER BOLTED CONNECTION.  
4. ALL BOLTS, 3/4" DIAMETER, A325-N, UNO.

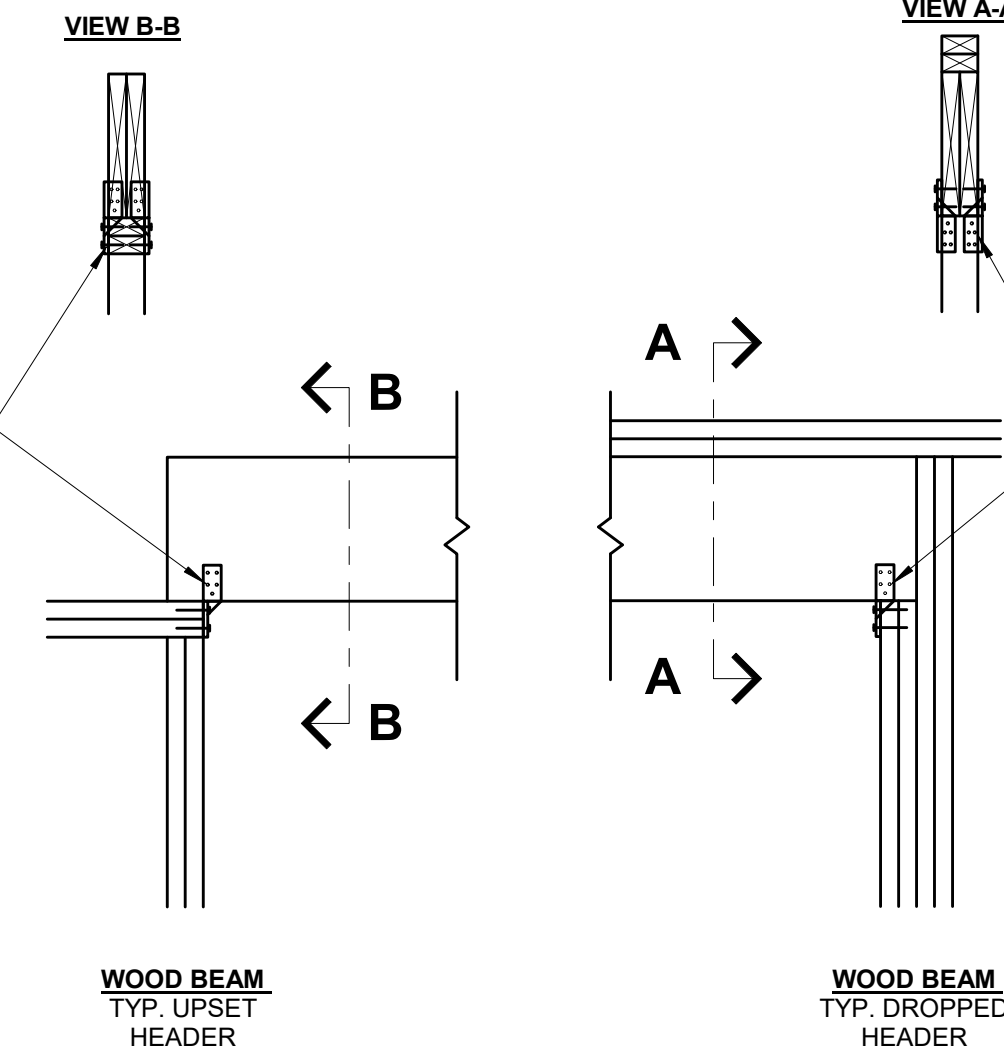
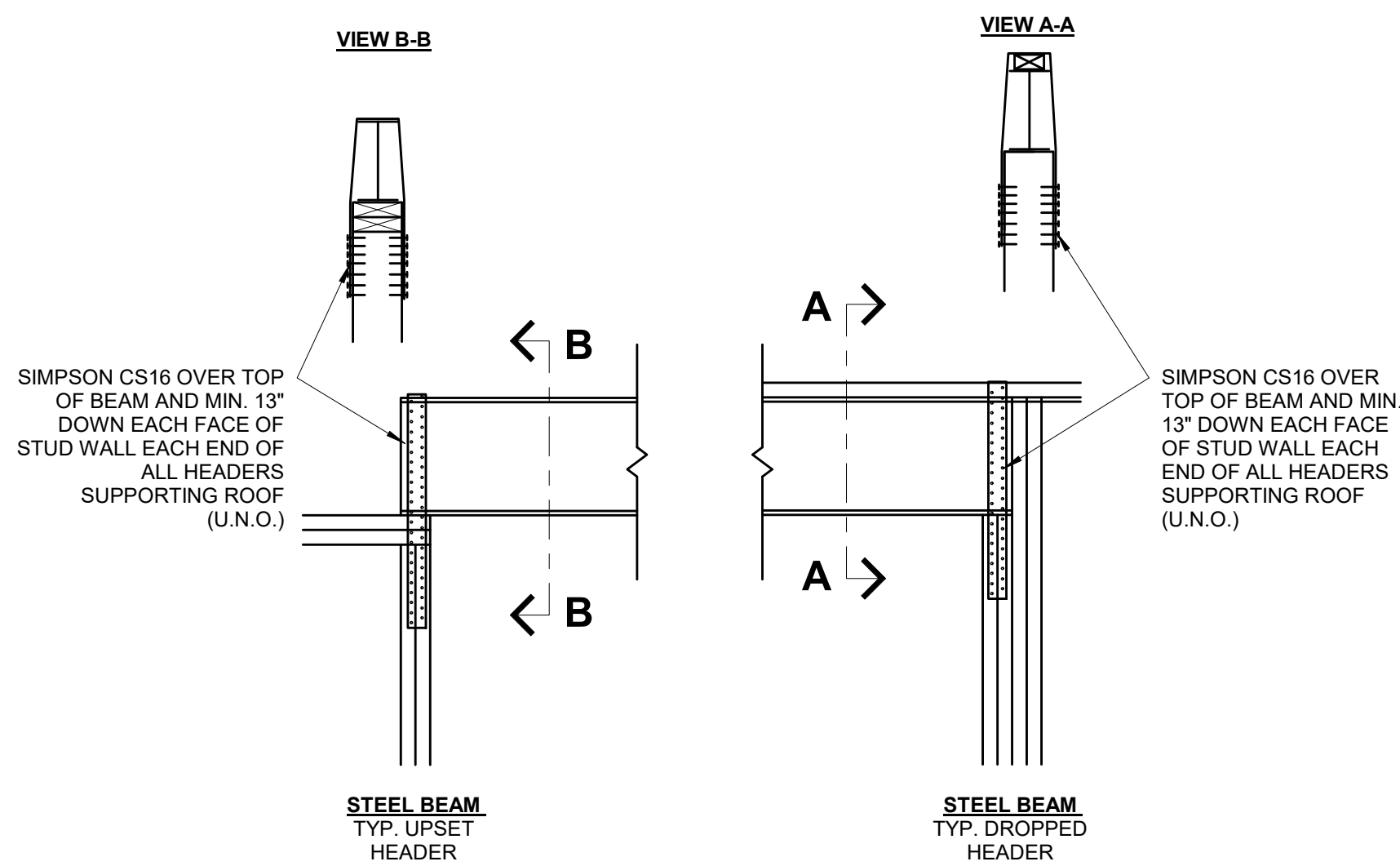


#### 2 BEAM SPLICE DETAIL

S3.1 1 1/2" = 1'-0"

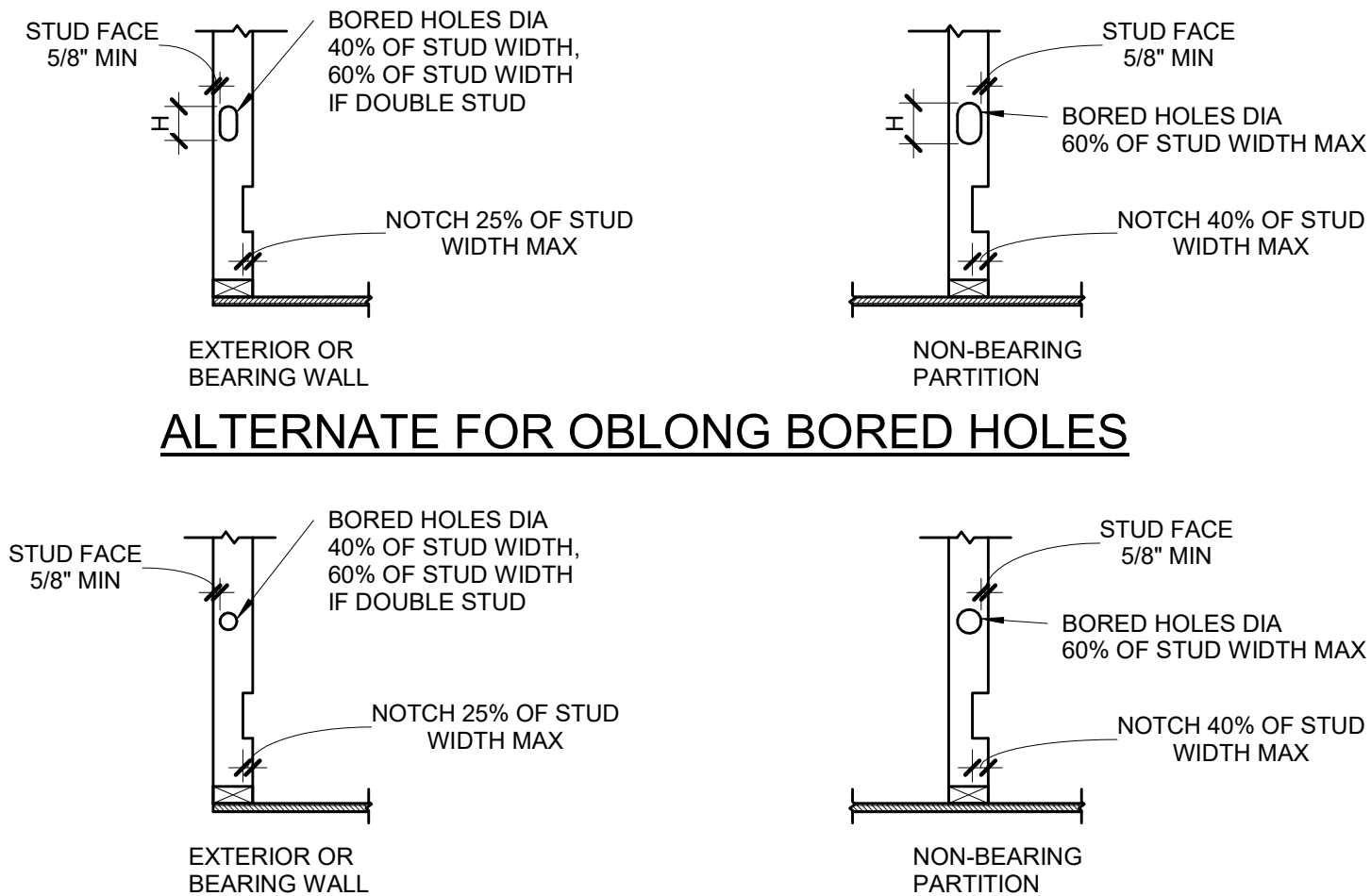


NOTES:  
1. EACH 2x PLY SHALL BE FASTENED WITH (1) ROW OF 10d NAILS AT 9" OC, ALTERNATING SIDE TO SIDE.  
2. 1.4" MIN EDGE DISTANCE, AND STARTING 2 1/2" FROM EACH END.  
3. EXTEND FULL AREA OF COLUMN AS SOLID BLOCKING THROUGH JOIST BAYS AND WALLS TO LOAD-BEARING BEAM/WALL BELOW.



#### 6 ROOF SUPPORTING BEAM HOLD DOWN

S3.1 3/4" = 1'-0" (COMPLIANCE WITH IRC R602.11)



PENETRATIONS THRU STUDS					
WALL SIZE	BORED HOLE SIZE			WALL NOTCH	
	STUDS LOAD BEARING OR EXTERIOR WALL	NON LOAD BEARING WALL	LOAD BEARING WALL	WALL LOAD BEARING	NON LOAD BEARING WALL
	40% 1 3/8"	50% -	25% 2 1/8"	25% 7/8"	25% 1 3/8"
2x4	-	2 1/8"	2 1/8"	7/8"	1 3/8"
(2) 2x4	-	2 1/8"	2 1/8"	7/8"	1 3/8"
2x6	2 1/4"	-	3 15/16"	1 3/8"	2 1/4"
(2) 2x6	-	3 5/16"	3 15/16"	1 3/8"	2 1/4"
2x8	2 7/8"	-	4 3/8"	1 13/16"	2 7/8"
(2) 2x8	-	4 3/8"	4 3/8"	1 13/16"	2 7/8"

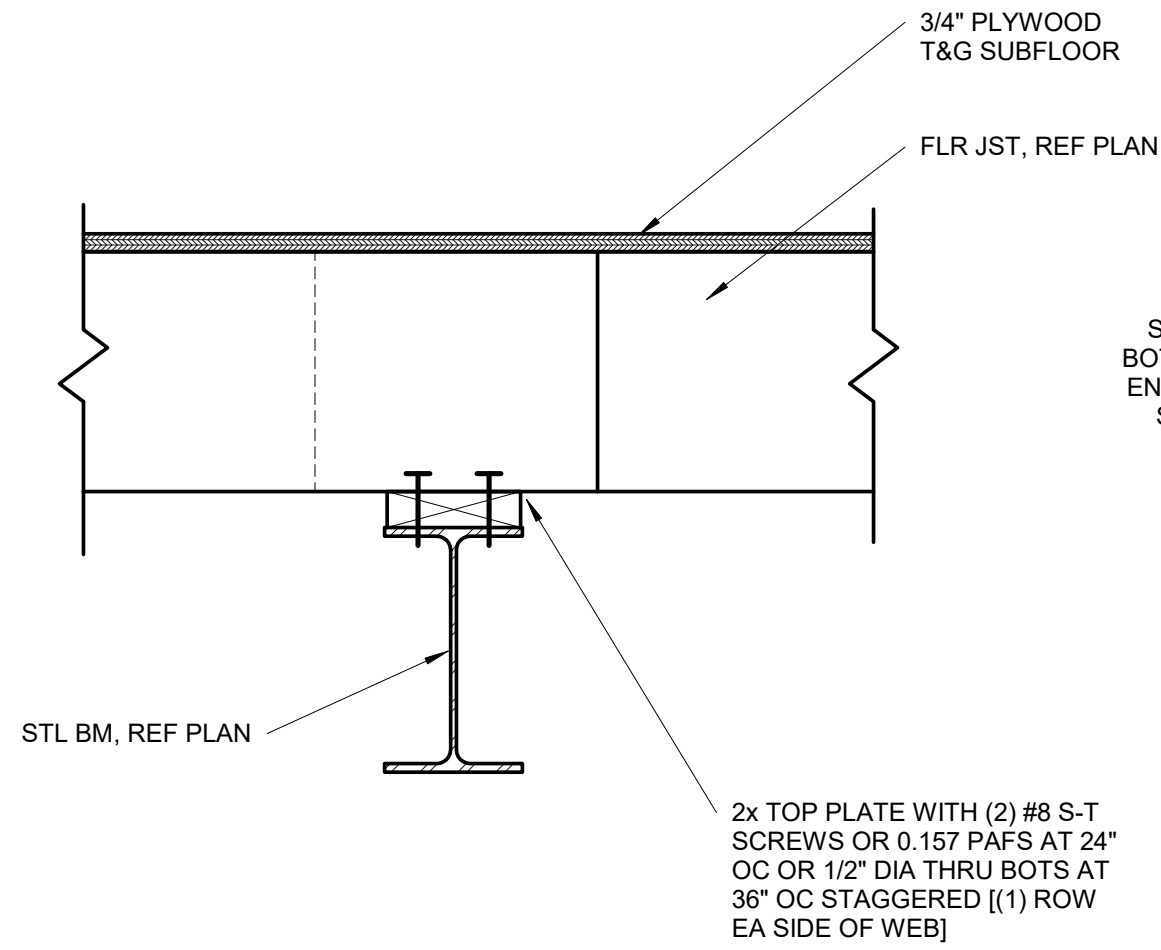
PLATES:  
TOP AND BOTTOM PLATE HOLE, CUT OR NOTCH THAT IS 50% MORE OF WIDTH MUST BE REPAIRED USING 16 GA (MIN) METAL TIE THAT IS AT LEAST 1-1/2" WIDE IF WALL IS A SHEAR WALL IT MUST BE REPAIRED USING HARDY FRAME SADDLE (HFS).

NOTE:  
SEE SECTION R602.6 AND FIGURES R602.6.1 AND R602.6.2

WALL SIZE	HOLE SIZE	VERTICAL HOLE SIZE (H)
2x4	1 3/4"	D+1/2" AT Lvl 1&2
2x6	2 3/4"	D+1" AT Lvl 3
2x8	3 5/8"	D+1 1/4" AT Lvl 4
		D+1 1/2" AT Lvl 5

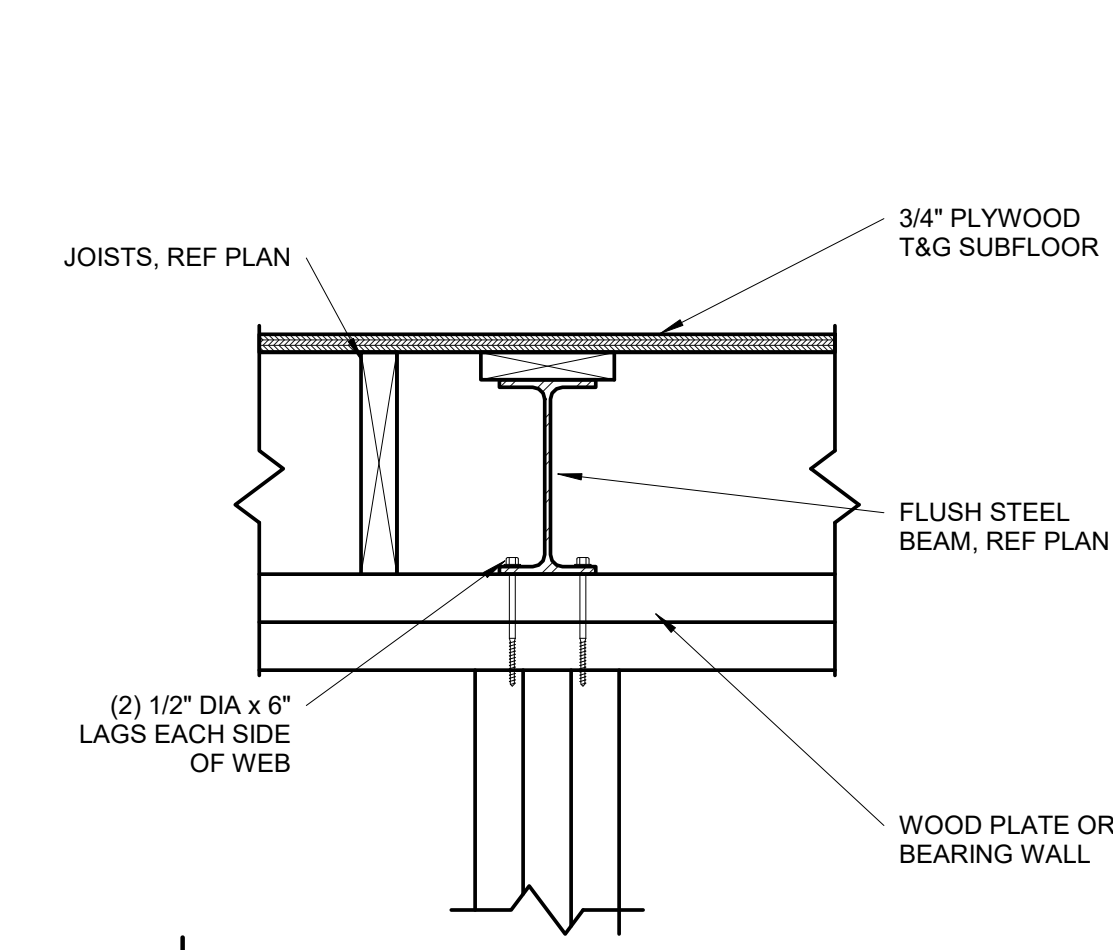
#### 5 DRILLING & NOTCHING DETAIL

S3.1 3/4" = 1'-0"



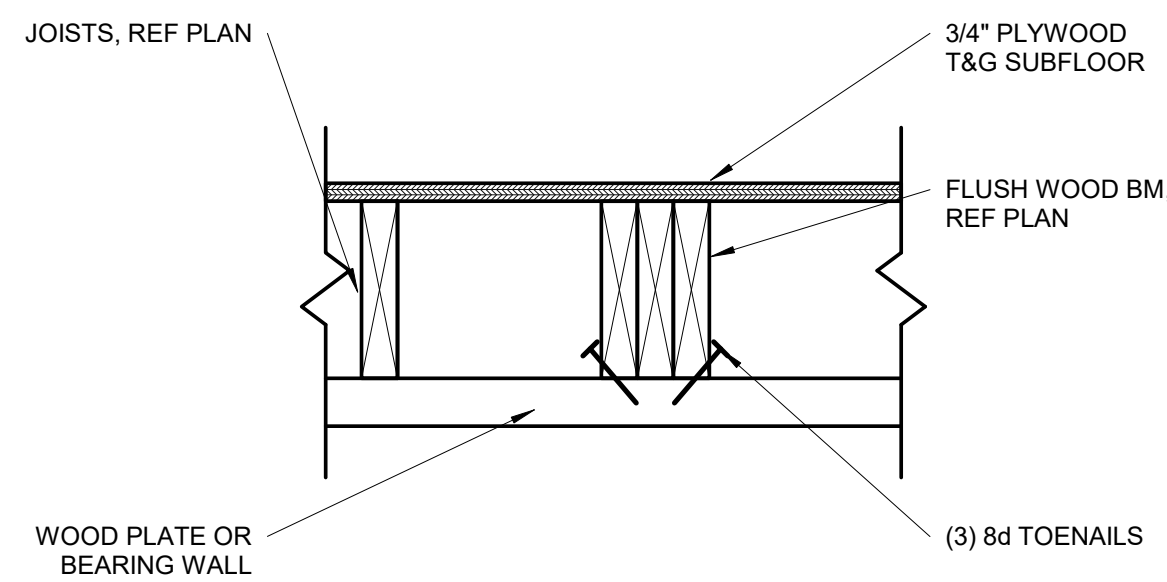
#### 9 WOOD PLATE TO STEEL BEAM CONNECTION

S3.1 1 1/2" = 1'-0"



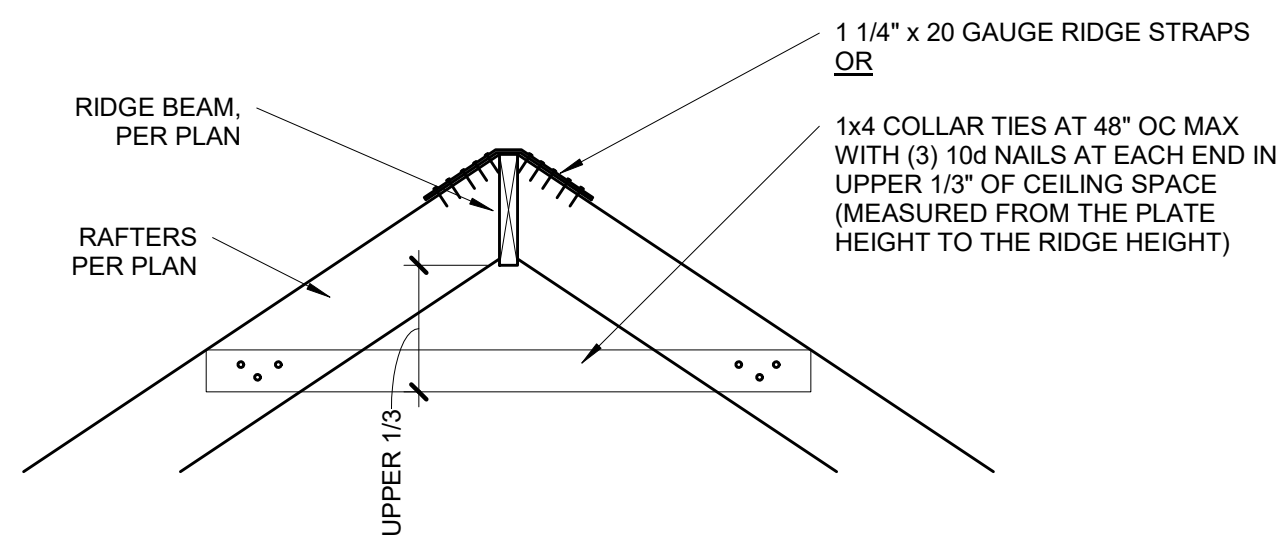
#### 8 FLUSH STEEL BEAM CONNECTION

S3.1 1 1/2" = 1'-0"



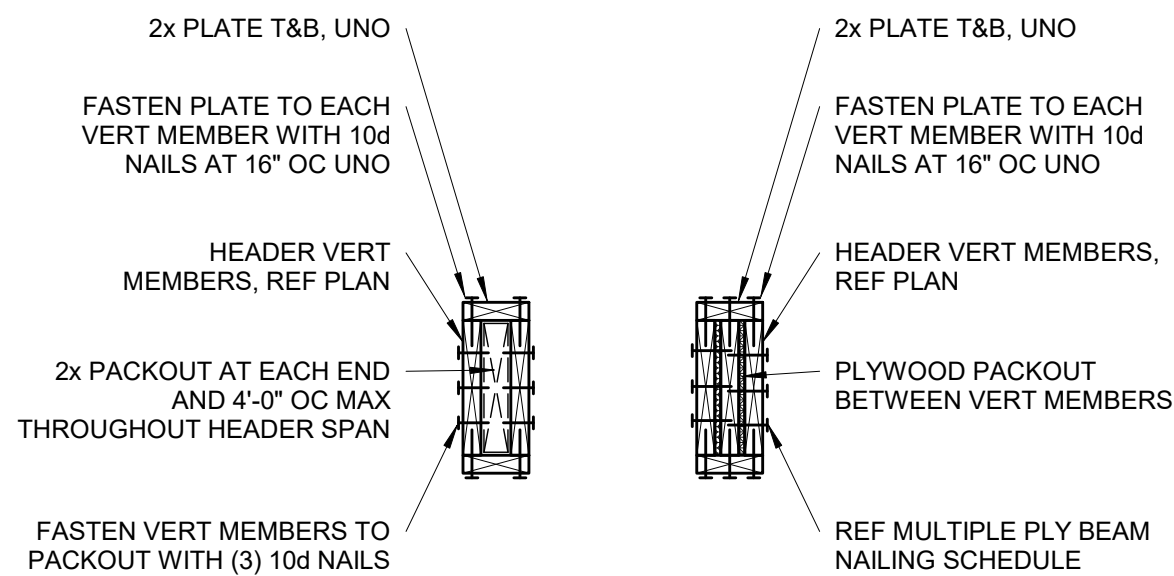
#### 7 FLUSH WOOD BEAM CONNECTION

S3.1 1 1/2" = 1'-0"



#### 12 RIDGE BEAM DETAIL

S3.1 3/4" = 1'-0"



#### 11 TYPICAL WOOD HEADER DETAIL

S3.1 NOT TO SCALE

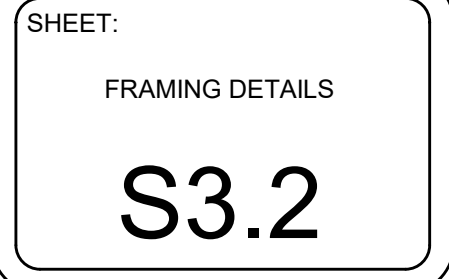
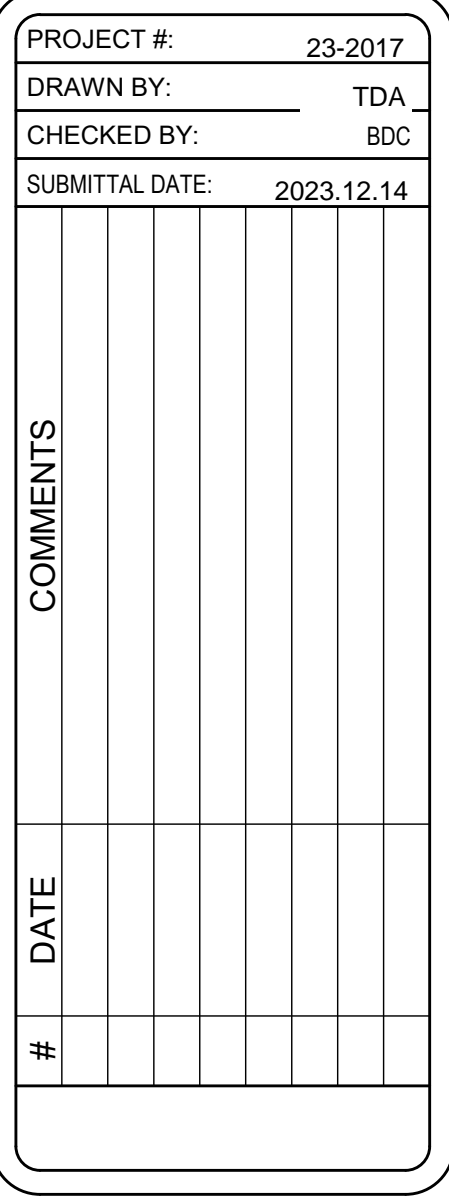
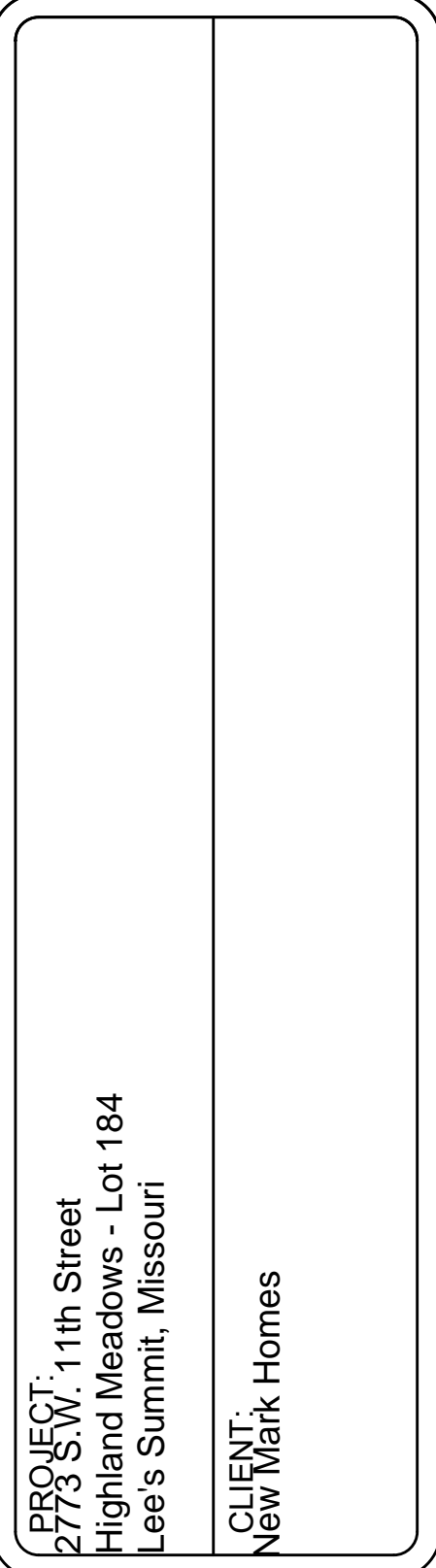
2 - PLY	3 - PLY	4 - PLY
(3) ROWS OF 16d x 3-1/2" NAILS AT 6" OC	(3) ROWS OF 16d x 3-1/2" NAILS AT 4" OC	(2) ROWS OF 1/2" DIA. A307 THRU-BOLTS AT 12" OC STAGGERED

NOTES:  
1. NAILING SHOWN APPLIES UNLESS SPECIFICALLY NOTED IN DETAILS.  
2. SPACE NAILS EVENLY THROUGHOUT DEPTH OF BEAM.

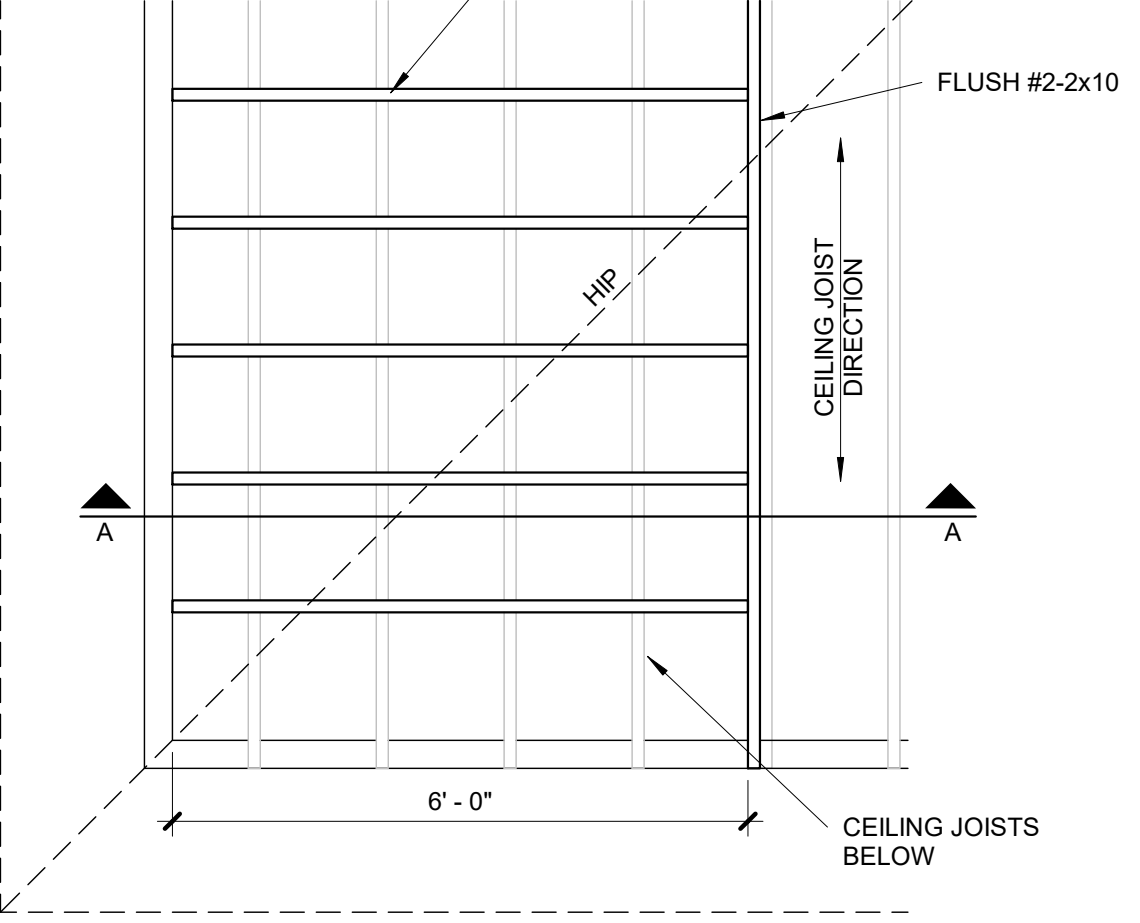
#### 10 MULTIPLE PLY BEAM NAILING SCHEDULE

S3.1 NOT TO SCALE

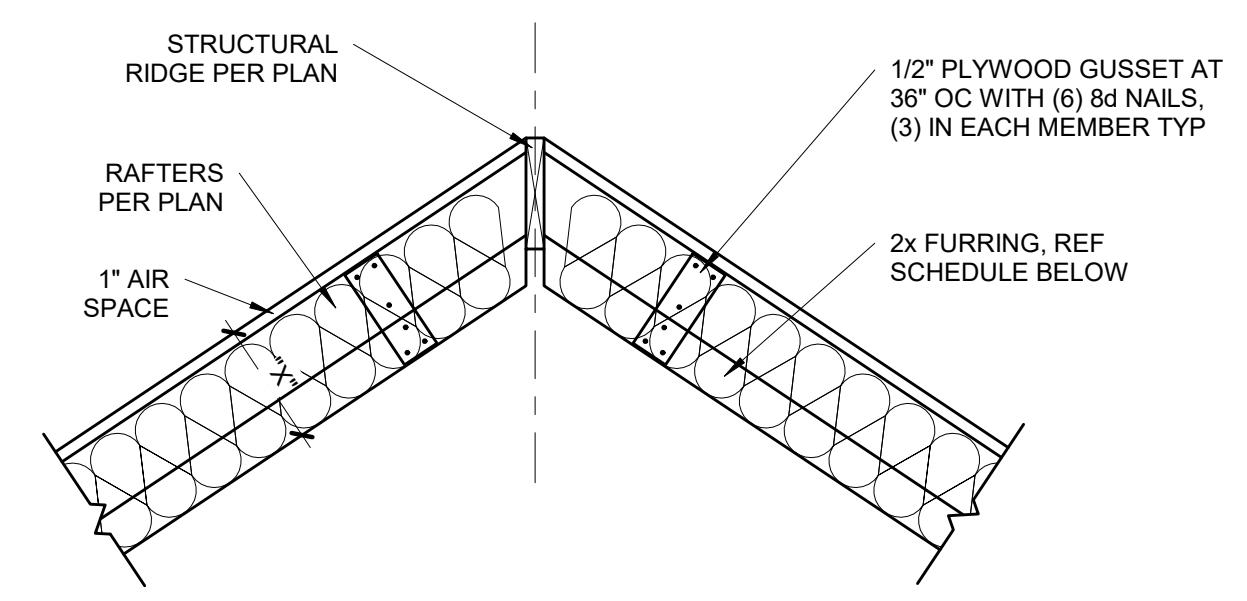
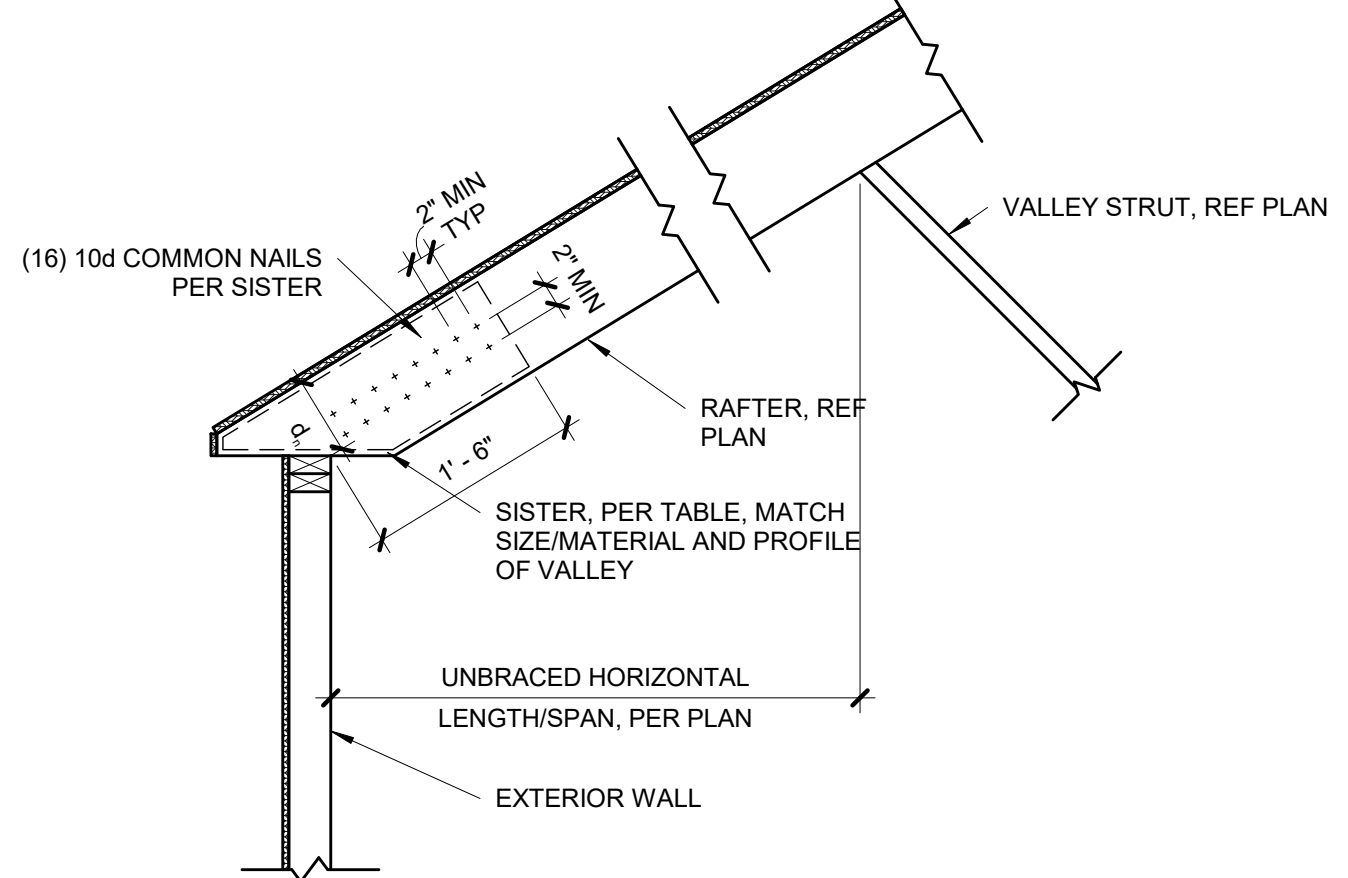




NOTES:  
-CHART IS ONLY APPLICABLE IF NO  
RAFTER BEAM SHOWN ON PLAN.  
-CONTACT EOR IF OVERHANG LENGTH  
EXCEEDS CHART OPTIONS.  
-ALTERNATE, REF BARGE RAFTER DETAIL  
FOR OVERHANGS 1'-0" OR LESS.



1. VALLEYS OF A LENGTH GREATER THAN THAT FOUND IN THE CELL ABOVE ARE CONTROLLED BY THE NUMBER OF ADDITIONAL PLIES OF SISTERS REQUIRED.
2. THIS TABLE IS INTENDED TO BE USED IN CONJUNCTION WITH THE STAMPED, ENGINEERED PLANS AS THEY ARE DRAWN BY APEX. BRACING LOCATIONS SHALL DETERMINE HORIZONTAL, UNSUPPORTED SPAN FROM VALLEY BEARING AND BE USED TO DETERMINE THE NUMBER OF SISTERS REQUIRED. BRACING LOCATIONS ARE **NOT** TO BE INFERRED USING THIS TABLE.
3. TABLE VALUES ARE BASED ON A DEPTH OF MEMBER REMAINING,  $d$ , EQUAL TO THE DEPTH OF THE RAFTERS. IF  $d$  IS OBSERVED TO BE LESS THAN THE DEPTH OF THE RAFTER, THE VALUE OF  $d$  SHALL BE USED TO BE USED TO BE REPLACED BY APEX.
4. TABLE VALUES ARE VALID FOR TAPERED CUTS ONLY. REF DETAIL 4/33.2.
5. IF MULTI-PLY VALLEY IS SPECIFIED ON PLAN TABLE EACH ADDITIONAL PLY AS A SISTER PLY WHEN LOOKING UP MAX SPAN.
6. MAX 14'-0" HORIZONTAL RAFTER SPAN IN BOTH DIRECTIONS FROM VALLEY.
7. ALL HIPS ARE DESIGNED TO BE CONTROLLED BY BENDING. SHEAR AT BEARING WITH MIN 5 1/2" DEPTH DOES NOT CONTROL DESIGN.



1. ALL VAULTED RAFTERS SHALL BE 2x26 DFL, MINIMUM, AT 16" OC, PER SPAN CHART, UNLESS NOTED OTHERWISE.
2. ALL VAULTS SHALL BE FURRED DOWN WITH 2x4 FRAMING TO THE REQUIRED DEPTH OF INSULATION, PLUS 1" AIR SPACE.
3. R-30 INSULATION = 8 1/4" THICK
4. R-38 INSULATION = 10 1/4" THICK
5. INSULATION REQUIREMENTS MAY BE REDUCED TO R30 IF ROOF/CEILING ASSEMBLY DOES NOT ALLOW SUFFICIENT SPACE BUT IS LIMITED TO VAULTED CEILING AREAS THAT ARE LESS THAN 500 SQUARE FEET OR 20 PERCENT OF THE TOTAL INSULATED CEILING AREA, WHICHEVER IS LESS. (PER N1102.2.2)

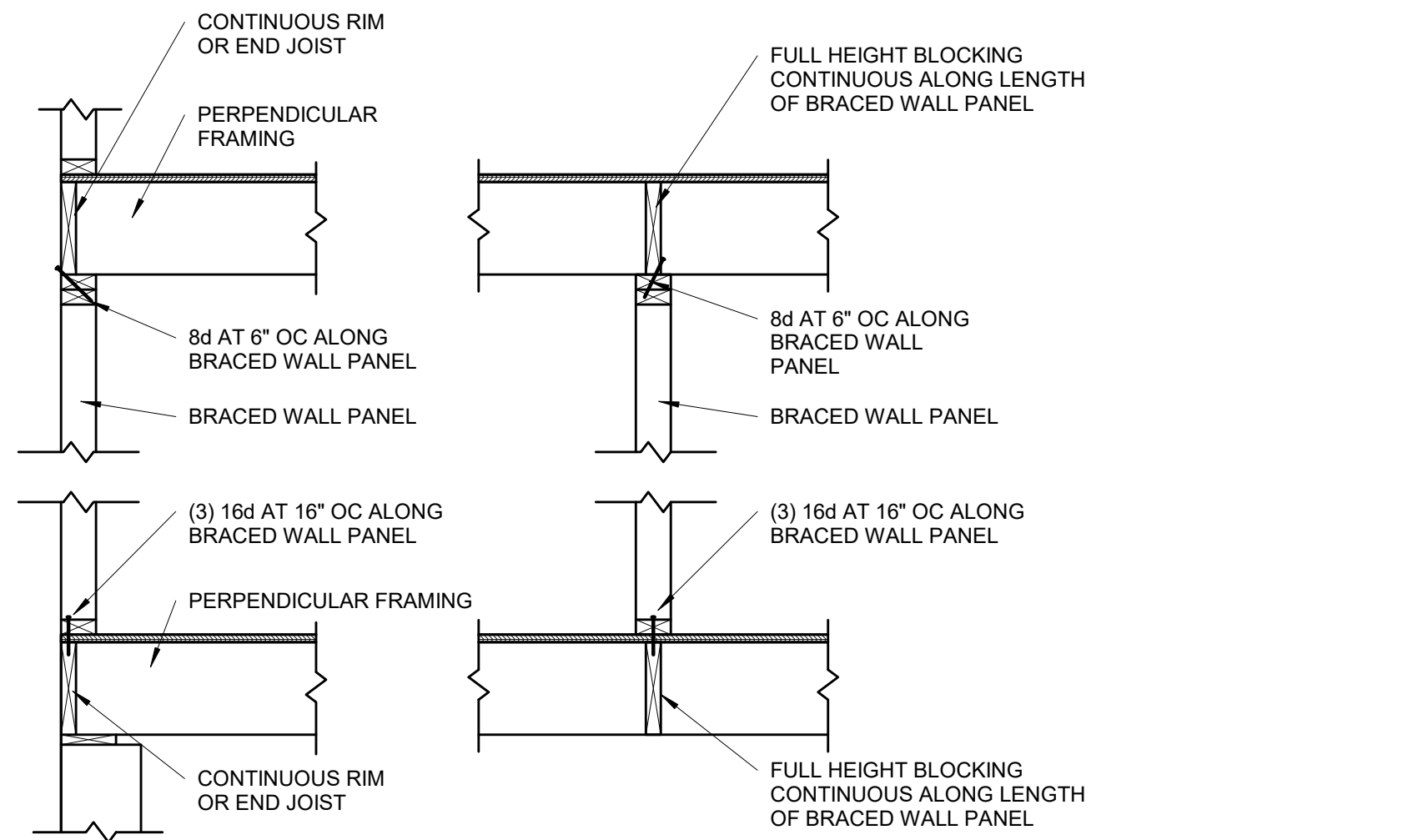


<b>S3.2</b>	$3/4" = 1'-0"$
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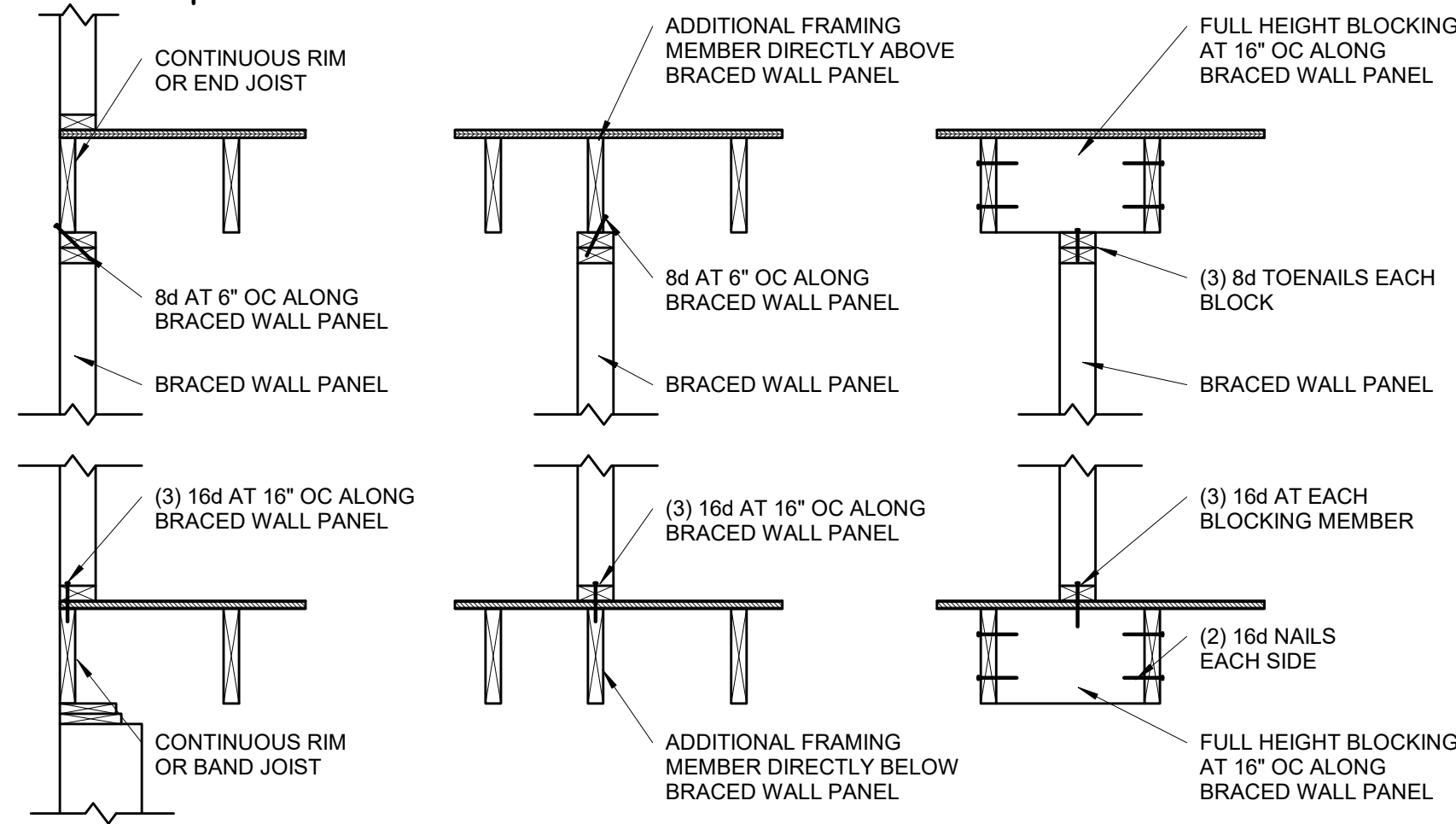




**BRACED WALL PANEL  
CONNECTION WHEN  
PERPENDICULAR TO  
FLOOR/CEILING FRAMING**

**S4.1**

3/4" = 1'-0"



**BRACED WALL PANEL  
CONNECTION WHEN PARALLEL  
TO FLOOR/CEILING FRAMING**

**S4.1**

3/4" = 1'-0"

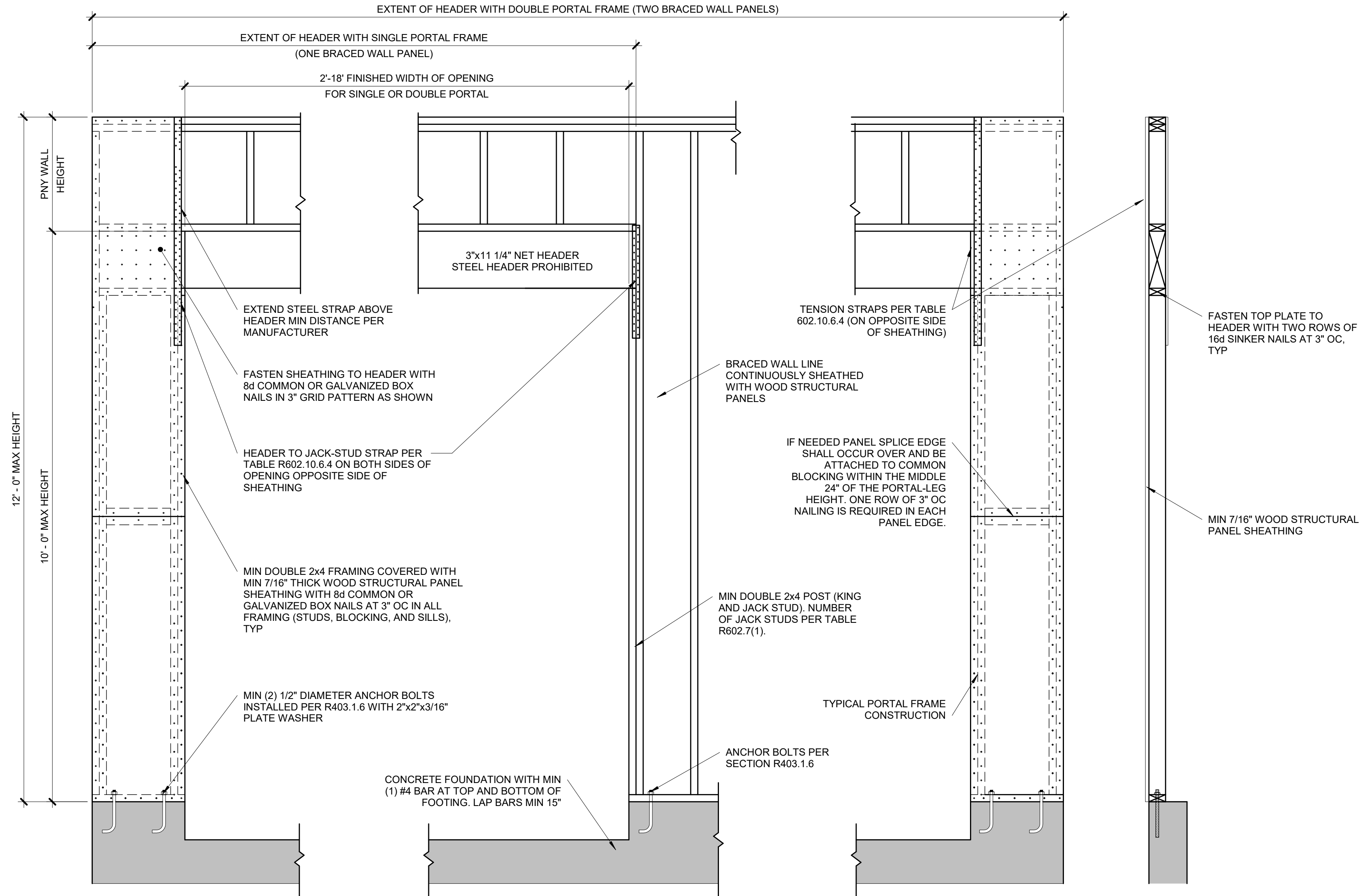
**CONT. SHEATHED BRACED WALL END CONDITIONS**

END CONDITION 1	END CONDITION 2
END CONDITION 3	END CONDITION 4
END CONDITION 5	REQUIREMENTS
	<p><b>RETURN PANEL:</b> 24" FOR BRACED WALL LINE SHEATHED WITH WOOD STRUCTURAL PANELS. 32" FOR BRACED WALL LINES SHEATHED WITH STRUCTURAL FIBERBOARD.</p> <p><b>DISTANCE D:</b> 24" FOR BRACED WALL LINES SHEATHED WITH WOOD STRUCTURAL PANELS. 32" FOR BRACED WALL LINES SHEATHED WITH STRUCTURAL FIBERBOARD.</p> <p><b>HOLD-DOWN DEVICE:</b> 800 LBS CAPACITY FASTENED TO THE EDGE OF THE BRACED WALL PANEL CLOSEST TO THE CORNER AND TO THE FOUNDATION OR FLOOR FRAMING BELOW.</p>

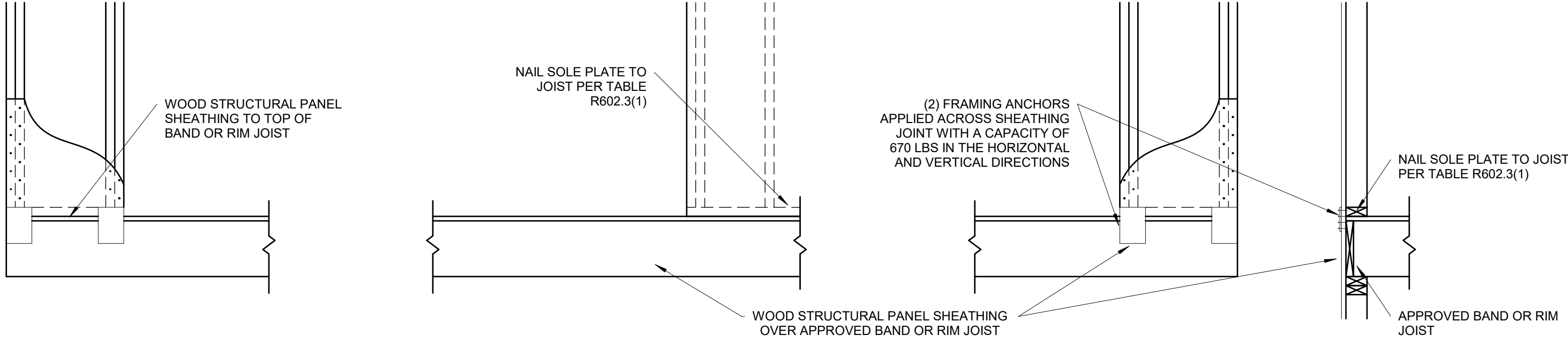
**CONTINUOUS SHEATHED BRACED  
WALL END CONDITIONS**

**S4.1**

NOT TO SCALE. (COMPLIANCE WITH IRC R602.10.7)

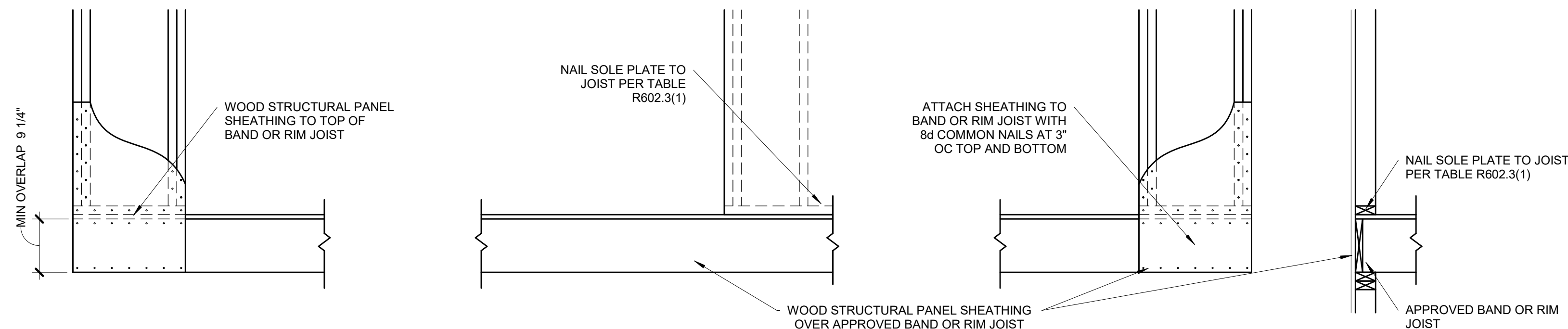


**OVER CONCRETE OR MASONRY BLOCK FOUNDATION**



**OVER RAISE WOOD FLOOR - FRAMING ANCHOR OPTION**

(WHEN PORTAL SHEATHING DOES NOT LAP OVER BAND OR RIM JOIST)



**OVER RAISE WOOD FLOOR - OVERLAP OPTION**

(WHEN PORTAL SHEATHING LAPS OVER BAND OR RIMBOARD)

**BRACED WALL PANEL-IRC  
METHOD CS-PF CONTINUOUSLY  
SHEATHED PORTAL FRAME  
1 PANEL CONSTRUCTION**

**S4.1**

3/4" = 1'-0"

(PER IRC R602.10.6.4)